



Final Bridge Type Study

Freedom Trail Phase IV
Akron, Ohio

Bridge over Broadway Avenue
Ramp Bridges to University Avenue

May 17, 2017



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May 17, 2017

Charles Hauber, PE, PS
Civil Engineer/Construction Supervisor
Summit Metro Parks
975 Treaty Line Road
Akron, Ohio 44313

**RE: Final Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio**

Dear Mr. Hauber,

In accordance with our scope of services, ms consultants, inc. is pleased to provide the attached Final Bridge Type Study for your review. We also include the disposition to SMP comments on the preliminary report and recent emailed revisions to the plans.

ms consultants, and our subconsultant Environmental Design Group, greatly appreciate the opportunity to work with you and Nick Moskos on this project. Please contact me at 216-403-0886 with any questions or concerns.

Kind regards,

A handwritten signature in black ink, appearing to read 'JDH', with a long horizontal stroke extending to the right.

Jonathan D. Hren, PE
Project Manager

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I. Executive Summary

General:

The Summit Metro Parks (SMP) has contracted with ms consultants, inc., with Environmental Design Group as subconsultant, to perform Bridge Type Studies to assist in the planning for the future Freedom Trail Phase IV. The scope of work includes evaluating trail alignments for the bridges, preliminary bridge layout, construction cost estimating, utility and stakeholder coordination, Environmental Site Assessments, and architectural renderings for Bridge #1. Work provided by the Summit Metro Parks and their consultants, which supplemented this study, includes subsurface investigations and foundation recommendations and survey.

The bridge locations included in this Type Study are described below, and located in Figure 1:

1. Bridge #1: This structure will carry the proposed trail from the proposed Schipper parking lot at 473 South High Street, over Broadway Avenue, to the east to the Metro RTA property
2. Bridge #2: This structure will carry the proposed trail from the City of Akron service road along the CSXT corridor (on City of Akron R/W) to the University Avenue Bridge elevation
3. Bridge #3: This structure will carry the proposed trail from the University Avenue Bridge elevation to along the CSXT corridor (Metro RTA R/W)

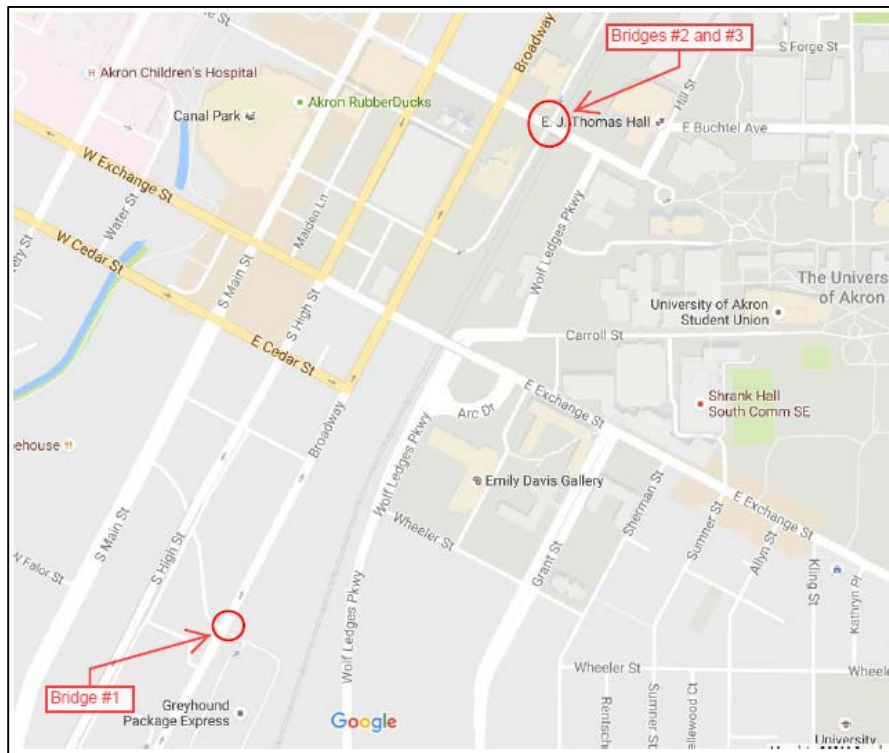


Figure 1 - Location Map

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The scope of the project was to prepare a maximum of two (2) conceptual preliminary design alternatives for each bridge site, with one concept advanced to the Final Bridge Type Study. However, this Final Type Study includes additional conceptual work to determine the most appropriate structure type and layout. It is anticipated that state and/or federal funds will be needed for this project, therefore the design will be based on state and federal requirements. The preliminary designs are based on the ODOT Bridge Design Manual, the ODOT Location and Design Manual, the AASHTO Guide Specifications for the Design of Pedestrian Bridges, the AASHTO Guide for the Development of Bicycle Facilities, and the AASHTO Policy on Geometric Design of Highways and Streets (aka "Green Book"). The specifications will be based on the latest ODOT Construction and Material Specifications (CMS).

Investigations:

The following investigations were performed as part of this Bridge Type Study:

1. Topographic Survey – This survey was completed by AECOM, as consultant to the SMP, and transmitted to ms consultants. Basemapping was provided for the west end of Bridge #1, and for Bridges #2 and #3. Additional previously performed basemapping for the east end of Bridge #1 at the Schipper lot was provided by SMP and performed by GPD, in advance of the work on this project. AECOM did not do a right-of-way survey. Property lines were provided, presumably from County GIS mapping.
2. Geotechnical Investigations – Timmerman Geotechnical Group performed the preliminary borings and foundation recommendations for this project. This report is included in Appendix A. In general, foundation types recommended include drilled shaft, driven pile, and spread footings, as well as MSE wall foundation recommendations where applicable. An MSE wall was not recommended for Bridge #1, due to poor soil conditions.
3. Environmental Site Assessment – Environmental Design Group (EDG), as subconsultant to ms consultants, performed an ESA report for the three (3) bridge sites. The report dated 1/17/2017 is included in Appendix A. In general at all locations, based on the samples taken as part of this project, "chemicals of concern were not detected at levels in exceedance of direct contact standards which would warrant special handling or disposal requirements during the assessment." However, based on the report done by SAS Environmental, Inc., for the Schipper Group (473 South High Street) site, which includes the west approach to Bridge #1, environmental impacts may be present, in the form of former UST and AST tanks. As the proposed ramp alignment passes through the former location of these tanks, remediation costs are included in the construction cost estimate.
4. Structure Design – Per the scope of this project, only concept level designs have been prepared. Therefore, engineering judgment has been utilized to determine the type, size and location of the proposed structures, to provide the planning level estimates required by the SMP. The Bridge Type Study describes the work performed, and includes summaries, details,

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and construction and design cost estimates for each bridge location. See below for recommendations.

5. Coordination with Stakeholders/Utilities – The SMP, the City of Akron, the University of Akron, the 473 High Street Property (aka “Schipper Group”), utility owners, and the Metro RTA have been coordinated with. It is noted that CSXT was not forwarded the plans for this project as SMP does not have an agreement in place for their review. It is anticipated that as this project moves into Stage 1 design that an agreement with CSXT will be established for this purpose. As part of this project, a Kick-off meeting was held at ms consultants’ office on October 11, 2016. Ongoing coordination has included determining the location of existing structures impacted, such as the University Avenue Bridge and the existing retaining walls along Bridge #2, utility coordination and conflict resolution, and the existing environmental site assessments performed at the Schipper property.
6. Aesthetics – Bridge #1 will have significance on this project as it will be a gateway bridge for those entering Akron from I-76/I-77. Traffic on this one-way arterial will increase after ODOT’s interchange project is complete and Broadway is reconfigured to the south. As part of this project, EDG is scoped to generate renderings for Bridge #1, and as part of this preliminary report two alternatives have been provided, located in Appendix D. These final renderings were sent by EDG to the Metro Parks in a separate transmission, thus they are included for reference only.

Recommendations:

As part of this preliminary study, we recommend the following:

Bridge #1 over Broadway: Alternative 3 which has a 317’ long west approach slab bridge system with both curved and tangent sections, on T-type piers on H-piling, with the trail circling under the proposed 129’ long prefabricated truss span over Broadway Avenue, supported by a T-type or wall type pier on H-piling and an abutment on H-piling. This structure provides the least cost, appropriate substructure type for the site conditions encountered, and also the simplest construction details, aesthetics notwithstanding. The AT&T fiber optic line will be avoided on the Rosa Parks side of the bridge approach, but approach fill on the west side of Broadway Ave will be required on top of this AT&T easement and the gas line. Costs for this easement and protection of the AT&T fiber optic line and gas line are included. **Total cost is \$1,622,744 + \$389,366 for aesthetics and landscaping, for a total of \$2,012,110.**

Bridge #2: Alternative 2, which is a 155’ long approach MSE wall system against the existing retaining wall, and 288’ long 4-span rolled beam-bridge carrying the trail up to the University Avenue Bridge. The spans of the proposed bridge are 72’. No utilities are affected by this alternative. This structure provides the least cost. **Total cost is \$956,782.**

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Bridge #3: Alternative 5, which is 432' long 5-span rolled beam-bridge and 116' long MSE wall approach section, carrying the trail from the University Avenue Bridge to the proposed alignment along within the Metro RTA right-of-way. Utility relocation of the MCI fiber optic line at the approach MSE wall may be required, and an assumed cost for this relocation is included. This structure provides the least cost. **Total cost is \$1,375,743.**

II. Preliminary Bridge Type Study

This Final Bridge Type Study Report is intended to present bridge type alternatives to assist the Summit Metro Parks (SMP) in evaluating the structure types for three proposed bridge locations, for the proposed Freedom Trail Phase IV project in downtown Akron, Ohio. Bridge #1 will carry the proposed trail from the 473 South High Street (aka “Schipper Group” property) over Broadway Avenue. Bridge #2 will carry the trail from ground level to the University Avenue bridge deck elevation. And Bridge #3 will carry the trail from the University Avenue bridge deck elevation to ground level. The bridge locations are shown in Figure 1 below.

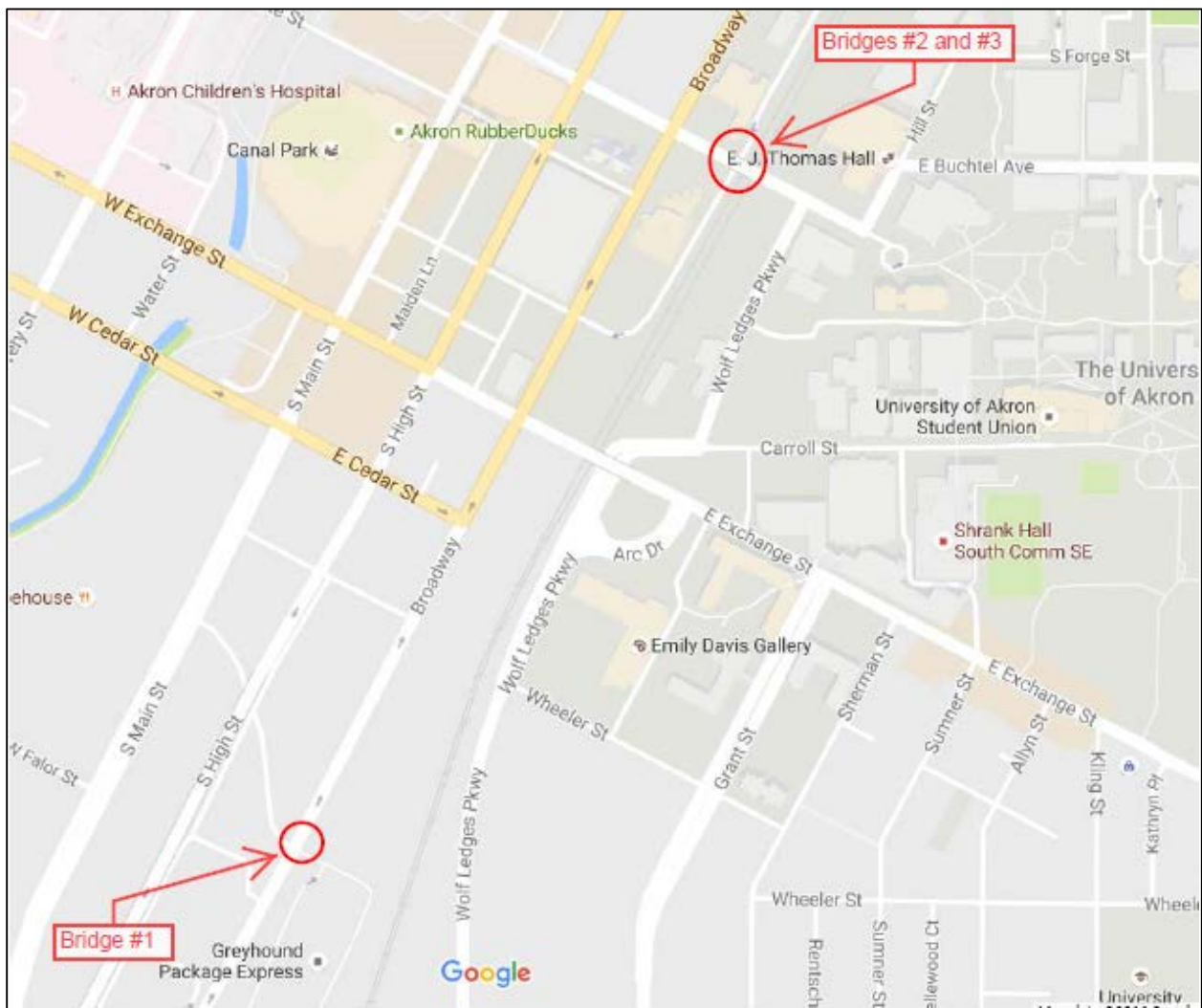


Figure 1 - Location Map

Bridge Type Studies:

In general, preliminary design for the proposed bridges consisted of reviewing the available documentation (e.g. survey, geotechnical report, and ESA report), and laying out the structure's geometry to meet AASHTO requirements. Structural calculations were not performed per the scope of services; i.e. engineering judgment was used to determine the type and size of the bridges and walls. The following summarizes the three bridges studied as part of this project.

- I. Bridge #1 - over Broadway Avenue from the Schipper Group Property to the Metro RTA property:
This structure is the gateway structure for the project and will provide a curving ramp structure within the southeast corner of the Schipper property to bring the proposed trail up to the bridge elevation. The trail will then follow the proposed simple span truss bridge over Broadway Avenue and then meet existing grade on the east side at the existing Metro RTA property.

Four (4) alternatives are presented, and are based on previous discussions with the SMP and review comments from the Preliminary Bridge Type Study Report, and differ mainly with regards to the configuration of the western approach ramp. All alternatives will utilize a prefabricated truss-type simple span bridge to cross over Broadway Avenue, and then meet existing grade with an abutment, embankment and cast-in-place wing walls on the eastern end of the structure. The alternatives include:

- Alternative 1: MSE Wall "Helical" Approach Ramp with Truss Main Span. This structure has a 382' long MSE wall and a 108' long truss bridge.
- Alternative 2: MSE Wall Curving Approach Ramp with Truss Main Span. This structure has a 325' long MSE wall and a 129' long truss bridge.
- Alternative 3: Curving Approach Slab Bridge with Truss Main Span. This structure has a 318' long approach ramp bridge and 129' long truss bridge.
- Alternative 4: Switchback Approach Slab Bridge with Truss Main Span. This structure has a 486' long approach ramp bridge and 108' long truss bridge.

- A. Utilities: Preliminary design work consisted of coordinating with all OUPS listed utility owners to determine conflicts and potential impacts and costs. Reference Appendix E for utility matrix, letters and correspondence. The utilities and their disposition/impacts are:

a. AT&T Fiber Optic

- i. Schipper Property: This buried utility was coordinated with to determine the impacts of construction on their easement for the portion of the utility at the Shipper lot. From those discussions in early October 2016, AT&T directed us that no construction is allowed on the easement with the exception of minimal grading and/or pavement, which could be excavated if necessary. Costs for relocation of the easement and fiber optic were investigated and amount to approximately \$600/ft. Based on discussions with the SMP, it was decided that alternatives that required relocation would not be considered given the fact that the alignments presented in this report were viable. Further,

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relocation of the easement would be further compounded by the fact that the recently constructed Rosa Parks Drive would have to be rebuilt, and the relocation costs do not reflect that. In summary, this utility will remain as is at the Shipper lot.

- ii. East Abutment: The AT&T FO line continues to the east under Broadway Avenue, and then into the embankment on the Metro RTA property. The proposed approach embankment will need to be built on top of this easement, and this cannot be avoided. It is possible that AT&T will require relocation or protection of the utility due to the presence of the additional fill. However, as part of this project we have assumed that this cost will be included in the contingency as noted in the cost estimate.
 - b. Gas – There is a gas line that runs along the west side of Broadway, crossing under the road, then up into the eastern embankment. This line is owned by Eastern Everflow Gas. Relocation of this line is possible due to its close proximity to the proposed abutments. While the need for relocation will not be determined until bridge design begins, assumed costs for relocation are included in the contingency. Dominion Gas does not have any facilities in the area.
 - c. Other Utilities – Other utilities discovered include the City of Akron Sewer and Water lines. According to this mapping the proposed bridge and walls should not conflict with these utilities. No additional costs have been included for other utility relocations/impacts.
- B. Structure Types: All structures are provided outside of the City of Akron’s 15’ building offset from the curb of the adjacent roadways. The ramp approach for all alternates will require right-of-way from the Schipper property and this has been discussed with SMP. Costs are not included for right-of-way. The proposed main bridge structure over Broadway Avenue for all alternatives is presumed to be a simple span, prefabricated steel through truss with painted tubular steel members. The structure will have a reinforced concrete deck and pedestrian railings. The proposed deck width will be 12’ from face-to-face of railings. The main span will be founded on a T-type or wall type pier to the east and medium height abutment to the west, both on H-piling. The approach ramp structure for Alternative 1 and 2 will be MSE wall embankments with ground improvements. The approach ramp structure for Alternative 3 and 4 will be slab bridges on T-type piers on H-piling. The site plans for each alternative show a concept bridge type and configuration, and typical sections show the proposed bridge and substructure configurations. Further discussion of each alternative follows.

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C. Alternatives Discussion:

Preliminary plans are located in Appendix C. The following describes each alternative.

- a. Alternative #1: This alternative consists of a circular MSE wall approach ramp at the Schipper property, and requires that a portion of the ramp span over itself with a slab bridge supported by the MSE wall. The MSE wall ramp will be approximately 382' long, and the truss bridge will be approximately 108' long. The east abutment will consist of a traditional cast-in-place abutment and wingwalls. The final renderings in Appendix E assist in depicting the concept. From Timmeran's Geotechnical Report, the recommended foundation types for the bridge are H-piles, which have been included in the preliminary cost estimate. The existing soil is not adequate to support the MSE wall without either over-excavation and replacement of material, or other ground improvements. Based on ms' past experience, we have included the costs for rammed aggregate piers spaced at 6' on centers to support the MSE wall embankment. Aesthetically pleasing parapets and fence are shown, and the parapet form liner can be similar to MSE walls. Costs are included for these items. This alternative is not recommend due to its high cost.
 - b. Alternative #2: This alternative will be similar to Alternative 1, but the western MSE wall ramp will consist of tangents and curves such that the trail can wrap around itself, and go underneath the main bridge over Broadway. The approach MSE wall will be approximately 325' long and the bridge will be approximately 129' long. This alternative is simpler to design and construct as only one bridge structure will be necessary. This alternative is not recommend due to its high cost.
 - c. Alternative #3: This alternative will be similar to Alternative 1, but the approach ramp will be supported by T-type piers on H-piling. The ramp bridge is less expensive than the MSE wall approach considering the need for ground improvements. EDG has provided renderings for this Alternative and these renderings are located in Appendix D. **This alternative is recommended due to cost and constructability of the ramp going underneath the main truss span.**
 - d. Alternative #4: This alternative will be similar to Alternative 3 except the approach ramp will be a switchback ramp, founded on T type piers and cantilever piers on H-piles, the latter supporting the superstructure on either sides of the column at different elevations to provide for the ramp grade. The length of the switchback ramp is 486' and the main truss span is 108'. This bridge is not recommend due to its high cost.
- D. Renderings: EDG has prepared the final renderings for this bridge as part of the scope of services. The renderings are based on Alternative 3, and are located in Appendix D. The construction and design costs for the architectural and landscaping additions are included separately.

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- E. Environmental Site Assessment: The Environmental Site Assessment performed by EDG is located in Appendix A. Based on this report, “chemicals of concern were not detected at levels in exceedance of direct contact standards which would warrant special handling or disposal requirements during the assessment.” However, based on the report done by SAS Environmental, Inc., for the Schipper Group (473 South High Street) site, which includes the west approach to Bridge #1, environmental impacts may be present, in the form of a former UST and AST tanks. As the proposed ramp alignment passes through the former location of these tanks, remediation costs are included in the construction cost estimate.
- F. Construction and Design Cost Estimates: The cost estimates can be found in Appendix B. The following summarizes the costs for each alternative:

Alternative	Construction Estimate	Inflation	Engineering /Design	Total
1	\$2,178,371	\$217,837	\$263,583	\$2,659,792
2	\$1,831,979	\$183,198	\$221,669	\$2,236,845
3	\$1,329,029	\$132,903	\$160,812	\$1,622,744
3 L&A*	\$342,605	\$34,261	\$12,500	\$389,366
4	\$1,600,369	\$160,037	\$193,645	\$1,954,051

* Alternative 3 Landscaping and Aesthetics items are itemized separately, see Appendix B

The construction estimate includes percentages for contingencies and incidentals as noted in Appendix B. At this time it is unknown when the bridge will be constructed, and a nominal 10% has been included for inflation. The engineering is assumed to be 11% of the final construction costs, including contingencies, incidentals and inflation.

G. Recommendation: Based on the total costs and discussion with the Summit Metro Parks, we recommend Alternative #3 be advanced to final design.

II. Bridge #2 - along the UA Business School retaining wall to the University Avenue Bridge

This structure will have a maximum 8.33% slope and provide the ramp the south side of the University Avenue Bridge, and be on the City of Akron R/W, This structure will ramp up to the existing University Avenue Bridge, along the west side of the paved one-way City service road and along the CSX corridor (and be within the City of Akron R/W). The 12’ wide ramp will first go under the UA Business School pedestrian bridge with a minimum vertical clearance of 8 feet (as required by AASHTO), then hold close to the existing taller retaining wall which supports the Business School building and grounds. The lower wall will be removed. At the top of the ramp the trail will continue onto the University Avenue sidewalk by removing a portion of the parapet and connecting to the proposed trail bridge parapet. Three alternatives are presented, and are all 443’ long. They include: 1) a 443’ long MSE wall Ramp; 2) a 155’ long MSE Wall with 288’ 4-span long

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bridge; and 3) an 83' long MSE wall and 360' 5-span bridge. For the bridge alternatives, a 72' typical span is provided, which will provide for a reasonable span length for planning purposes. Bridge piers will be hammerhead type, and the foundations consist of drilled shafts as recommended by Timmerman.

A. Utilities: The original survey basemap provided by AECOM did not indicate any utilities in the area of the bridge. However, on 12/21/16, AECOM provided storm sewer maps from the City of Akron, indicating the possible conflict of a 42" brick sewer at this location, owned by the City of Akron. On 1/5/17, the SMP forwarded the updated survey basemap with the sanitary sewer located, and there does not appear to be any conflict. Also, the MCI fiber optic has been added to the basemap, and no conflict exists with that line either.

B. Alternatives Discussion:

Preliminary plans are located in Appendix C. The following describes each alternative.

- a. Alternative #1: This alternative consists of a linear MSE wall, 443' in length, running essentially parallel to the UA Business School retaining wall. The wall alignment was established to run parallel to the existing lower retaining wall, which will be removed. Timmerman's geotechnical report recommends MSE walls as an acceptable structure type. The MSE wall will abut the edge of the University Avenue Bridge. Typical parapets and fence are provided, with form lined surfaces of the parapet shown and included in the cost estimate. A Site Plan and two Transverse Sections are provided in Appendix C.
 - b. Alternative #2: This alternative consists of a 155' long linear MSE wall and 288' long 4-span bridge, with 72' typical spans. The bridge will be a 2-beam system supporting a reinforced concrete deck. The bridge piers will be founded on drilled shafts. The bridge will abut the edge of the University Avenue Bridge. Typical parapets and fence are provided, with form lined surfaces of the parapet shown and included in the cost estimate. A Site Plan was not generated for this Preliminary Type Study, however if this alternative is chosen we will prepare a Site Plan. A Transverse Section is provided. Plans are located in Appendix C. **This alternative is recommended due to cost.**
 - c. Alternative #3: This alternative is similar to Alternative #2, and consists of an 83' long linear MSE wall and 360' long 5-span bridge, also with 72' typical spans. A Site Plan was not generated for this Type Study. A Transverse Section is provided. Plans are located in Appendix C.
- C. Environmental Site Assessment: The Environmental Site Assessment performed by EDG is located in Appendix A. Based on this report, "chemicals of concern were not detected at levels

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in exceedance of direct contact standards which would warrant special handling or disposal requirements during the assessment.” Therefore, the construction costs do not include any additional costs for remediation.

- D. Construction and Design Cost Estimates: The construction cost estimate can be found in Appendix B. The following summarizes the costs for each alternative:

Alternative	Construction Estimate	Inflation	Engineering	Total
1	\$1,031,645	\$103,165	\$113,481	\$1,248,291
2	\$790,729	\$79,073	\$86,980	\$956,782
3	\$818,074	\$81,807	\$89,988	\$989,869

The construction estimate includes percentages for contingencies and incidentals as noted in Appendix B. At this time it is unknown when the bridge will be constructed, and a nominal 10% has been included for inflation. The engineering is assumed to be 11% of the final construction costs, including contingencies, incidentals and inflation.

- E. Recommendation: Based on the total costs we recommend Alternative 2 be advanced to final design.**

III. Bridge #3 from the University Avenue Bridge to grade along the CSX railroad corridor

This structure will be on the north side of the University Avenue bridge. It was modified from the preliminary design to provide a maximum 5% slope, thus the structure was lengthened. The structure will provide the 12’ wide trail a ramp down from the existing University Avenue Bridge, along the east side of the CSX corridor (and be within Metro RTA R/W). At the top of the ramp a portion of the parapet at the University Avenue sidewalk will be removed to connect to the proposed trail bridge parapet. Four alternatives are presented, and are all 443’ long. They include: 1) a 405’ long MSE wall with 143’ long 2-span bridge; 2) a 332’ long MSE wall with 216’ long 3-span long bridge; 3) a 260’ long MSE wall and 288’ long 4-span bridge; 4) a 188’ long MSE wall and 360’ long 5-span bridge; and 5) a 116’ long MSE wall and 432’ long 6-span bridge. For all bridge alternatives, a 72’ typical span is provided, which will provide for a reasonable span length for planning purposes. Bridge piers will be hammerhead type, and the foundations consist of drilled shafts. Spread footings were originally detailed and recommended by Timmerman, however due to the located AT&T fiber optic line, single drilled shafts are now detailed to minimize impacts to that line. See Utility discussion below.

- A. Utilities: The survey basemap provided by AECOM did not indicate any utilities in the area of the bridge. However, on 12/21/16, AECOM provided storm sewer maps from the City of Akron, indicating the possible conflict of an 18” storm sewer at this location, owned by the City of Akron. Since that time the storm was located and surveyed, and there is no apparent

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conflict. There is however, an AT&T fiber optic line that was located after submission of the Preliminary Bridge Type Study. This line runs within Metro RTA R/W. In order to minimize impacts to this utility, the structure was relocated to run along the south property line, keeping the bridge and walls within the Metro RTA R/W. Further, a longer bridge structure, founded on drilled shafts, was designed, to minimize impacts to that FO line. However, an approach MSE wall retained earth structure (or alternate CIP wall structure) is unavoidable to bring the ramp down to grade, and more than likely the AT&T FO line will require relocation for this approximate 116' length. Cost have been estimated at \$75,000 for this relocation and are included in the cost estimate. We recommend that SMP perform SUE Level A test holes be used during Stage 1 design to accurately locate the line, and to ensure that relocation is necessary and the extents of this work.

B. Alternatives Discussion:

Preliminary plans are located in Appendix C.

- a. Alternative #1: This alternative consists of a 405' long MSE wall and 143' long 2-span bridge, with 72' typical spans. The bridge will be a 2-beam system supporting a reinforced concrete deck. The bridge piers will be founded on drilled shafts. The profile of the bridge will have a 5% grade. Horizontally the bridge is located along the Metro RTA R/W to minimize impact to the aforementioned AT&T fiber optic line. The bridge will abut the edge of the University Avenue Bridge. Typical parapets and fence are provided, with form lined surfaces of the parapet shown and included in the cost estimate. The MSE wall system will be back to back, and the length of this wall was established based on the maximum allowable height utilizing this configuration. A Site Plan and Transverse Sections of the bridge and wall is provided. Plans are located in Appendix C.
- b. Alternative #2: This alternative is similar to Alternative #1, and consists of a 332' long MSE wall and 216' long 3-span bridge, also with 72' typical spans. A Site Plan was not generated for this Type Study. Transverse Sections are similar to Alternative #1 and are provided. Plans are located in Appendix C.
- c. Alternative #3: This alternative is also similar to Alternative #1, and consists of a 260' long MSE wall and 288' long 4-span bridge, also with 72' typical spans. A Site Plan was not generated for this Type Study. Transverse Sections are similar to Alternative #1 and are provided. Plans are located in Appendix C.
- d. Alternative #4: This alternative is also similar to Alternative #1, and consists of a 188' long linear MSE wall and 360' long 5-span bridge, also with 72' typical spans. A Site Plan was not generated for this Type Study. Transverse Sections are similar to Alternative #1 and are provided. Plans are located in Appendix C.

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- e. Alternative #5: This alternative is also similar to Alternative #1, and consists of a 116' long linear MSE wall and 432' long 6-span bridge, also with 72' typical spans. A Site Plan was not generated for this Type Study. Transverse Sections are similar to Alternative #1 and are provided. Plans are located in Appendix C. **This alternative is recommended due to cost and minimizes the impact to the AT&T fiber optic line.**

- C. Environmental Site Assessment: The Environmental Site Assessment performed by EDG is located in Appendix A. Based on this report, "chemicals of concern were not detected at levels in exceedance of direct contact standards which would warrant special handling or disposal requirements during the assessment." Therefore, the construction costs do not include any additional costs for remediation.

- D. Construction and Design Cost Estimates: The construction cost estimate can be found in Appendix B. The following summarizes the costs for each alternative:

Alternative	Construction Estimate	Inflation	Engineering	Total
1	\$1,658,776	\$165,878	\$182,465	\$2,007,119
2	\$1,501,552	\$150,155	\$165,171	\$1,816,878
3	\$1,331,869	\$133,187	\$146,505	\$1,611,562
4	\$1,208,937	\$120,894	\$132,983	\$1,462,814
5	\$1,136,978	\$113,698	\$125,068	\$1,375,744

The construction estimate includes percentages for contingencies and incidentals as noted in Appendix B. At this time it is unknown when the bridge will be constructed, and a nominal 10% has been included for inflation. The engineering is assumed to be 11% of the final construction costs, including contingencies, incidentals and inflation.

Included in the contingencies are CSXT railroad coordination and reviews. Due to the proximity of the proposed bridge adjacent to their right-of-way, CSX requires coordination and reviews to be performed.

- E. **Recommendation: Based on the total costs we recommend Alternative 5 be advanced to final design.**

III. Conclusion

This Final Bridge Type Study is presented to provide the Summit Metro Parks the design alternatives and associated investigations, and provides a final bridge type recommendation for the three proposed bridges for this project. Preliminary investigations included survey and geotechnical recommendations, both provided by the SMP through their consultants AECOM and Timmerman Geotechnical Group, respectively. Environmental Design Group (EDG), as subconsultant to ms consultants, performed the trail alignments and architectural renderings, as well as the Environmental Site Assessment investigation and report.

The project consists of three bridges, which are to be constructed as part of the future Freedom Trail Phase IV. This study outlines suggested alternatives for these structures, as well as additional work which is recommended at the project continues into Stage 1 and Final Design. This additional work will include continued coordination with utilities and stakeholders, coordinating with CSXT railroad for their reviews, providing subsurface utility reconnaissance to accurately locate affected utilities, final R/W survey and R/W plans, and providing final design and aesthetic and landscaping plans and construction cost estimates.

Based on this Final Bridge Type Study, the following structure recommendations are made:

1. Bridge #1: This will be the Summit Metro Parks' gateway bridge over Broadway Avenue. Alternative #3 is recommended for this bridge, and consists of a radial and tangent approach ramp bridge system adjacent/on the Schipper lot (473 South High Street), a prefabricated truss bridge, and a short cast-in-place abutment with wingwalls on the Metro RTA property. Renderings and bridge type study plans have been provided. The estimated design and construction cost for this alternative is \$2,012,110.
2. Bridge #2: This structure will allow the trail to ramp up from the south to the University Avenue Bridge. Alternative #2 is recommended, and consists of an MSE wall and 4-span bridge adjacent to the University of Akron's retaining wall, located on the City of Akron R/W. The estimated design and construction cost for this alternative is \$956,782.
3. Bridge #3: This structure will allow the trail to ramp down to the north, from the University Avenue Bridge to grade. Alternative #4 is recommended, and consists of 5-span bridge with short approach back-to-back MSE wall system, located on Metro RTA R/W. The estimated design and construction cost for this alternative is \$1,375,743.

Appendix A

Environmental Site Assessment and Geotechnical Report

December 9, 2016
Revised January 17, 2017

Mr. Jonathan D. Hren
MS Consultants, Inc.
One Cascade Plaza, Suite 140
Akron, Ohio 44308-1116

RE: Freedom Trail, Phase IV
Environmental Site Assessment
Environmental Design Group Project No. 16-00212-010

Dear Mr. Hren:

Environmental Design Group has conducted an Environmental Site Assessment including the review of previous environmental assessments provided for review and the collection of soil samples from geotechnical borings at three (3) locations within the project area. Soil samples were collected by Timmerman Geotechnical Group, Inc. during installation of the geotechnical borings for this project. The geotechnical report, including a map of the geotechnical boring locations is included in **Appendix A**. Soil samples were collected from select borings and at depths designated by Environmental Design Group. Locations assessed within this report include the Schipper property (473 South High Street) west of Bridge 1 (**Figure 1**), the Akron Metro property east of Bridge 1 (**Figure 2**), and the University Avenue approaches, Bridge 2 and 3 (**Figure 2**). The findings of the assessment for each section are provided below.

Schipper Property West of Bridge 1

The text and figure 1 through figure 3, of a Draft Limited Phase II Investigation on 489 South High Street (now part of the property located at 100 Rosa Parks Drive) were provided to Environmental Design Group for review. The investigation was conducted by Partners Environmental Consulting, Inc. and dated December 22, 2014. This report also included a review of a Phase II Investigation conducted on 475 South High Street, the property to the north of 489 South High Street. 475 South High Street is now part of the properties located at 100 Rosa Park and parcel 6763719, which has an address of South Broadway Street with no associated street number. Parcel 6763719 is located within the project limits and 100 Rosa Park is located to the south of the project limits.

Soil sample results reported metals and PAHs above Ohio EPA Voluntary Action Program (VAP) commercial/industrial and construction worker direct contact standards in several of the borings located on 475 South High Street. Approximate soil boring locations are shown on **Figure 1**. Soil sample results were not compared to residential land use standards. The samples reported with exceedances of these standards were located on the western side of the property. Exceedances of the commercial/industrial and construction worker direct contact standards were not reported in samples collected near the eastern side of the property, within or near the project limits.. These findings are consistent with data collected in geotechnical borings during this assessment.

A Limited Environmental Assessment conducted by SAS Environmental, Inc. (SAS Environmental) dated December 4, 2015 was also provided to Environmental Design Group for review. The assessment was conducted on the Schipper Property located at 473 South High Street.

This report stated that an 8,000-gallon diesel fuel underground storage tank (UST) was removed from the southern portion of the Property in 1998. A diesel fuel dispenser, a concrete pad and associated piping for a former diesel aboveground storage tank (AST) were observed on the property at the time the assessment was conducted. An iron pipe was observed leading into a small vault near the concrete pad and diesel staining and odors were observed emanating from the vault. The former diesel tanks were located near the southern property line. The approximate location of the diesel dispenser, former AST pad and former UST are shown on **Figure 1**.

Two (2) soil samples from this property were collected as part of this assessment and analyzed for VOCs, PAHs, and 8 RCRA metals. Soil samples were collected from a depth of 0-2 feet below ground surface (bgs) in geotechnical borings B-2 and B-3. Soil samples were collected in laboratory supplied containers. It is Environmental Design Group's understanding that probe tooling was decontaminated between samples and samples were immediately put on ice and then kept in a refrigerator until delivered to the laboratory for analysis. Soil sample analysis was conducted by Summit Environmental Technologies.

Soil samples were analyzed for Volatile Organic Compounds (VOCs) by EPA Method 8260, Polycyclic Aromatic Hydrocarbon (PAHs) by EPA Method 8270, and for 8 RCRA Metals by EPA Method 6010/7470-7471. Soil sample analytical results were compared to the VAP Generic Direct Contact Standards for Residential Land Use, Commercial/Industrial Work, and Construction/Excavation Worker.

Three (3) metals were detected in both soil sample B-2 and B-3. Metals detected include arsenic, barium, and chromium. No metals were detected at levels in exceedance of the VAP direct contact standards. No PAHs or VOCs were detected in soil samples B-2 or B-3. Data results are included in **Table 1**.

Akron Metro Property East of Bridge 1

No previous assessments were available for review by Environmental Design Group for the Akron Metro property. One (1) soil sample was collected on the Akron Metro property during this assessment. This sample was collected in the same manner as detailed above. The soil sample was collected from 0-2 feet below ground surface in B-1. The soil sample was analyzed for VOCs by EPA Method 8260, PAHs by EPA Method 8270, and for 8 RCRA Metals by EPA Method 6010/7470-7471. Soil sample analytical results were compared to the VAP Generic Direct Contact Standards for Residential Land Use, Commercial/Industrial Work, and Construction/Excavation Worker.

Four (4) metals were detected in soil sample B-1. Metals detected include arsenic, barium, chromium, and lead. No metals were detected in exceedance of the VAP standards.

One (1) PAH, chrysene, was detected in soil sample B-1 at 0.0969 mg/kg. Chrysene detected in soil sample B-1 did not exceed VAP direct contact standards.

Three (3) VOCs included 1,2,4-trimethylbenzene, toluene, and xylenes were detected in soil sample B-1. VOCs detected did not exceed VAP direct contact standards. Data results are included in **Table 1**.

University Avenue Approaches, Bridge 2 and 3

No previous assessments were available for review by Environmental Design Group for the areas near University Avenue. Three (3) soil samples were collected in this area. The soil samples were collected from 0-2 feet below ground surface in B-5, B-7 and B-10. Soil samples were analyzed for VOCs by EPA Method 8260, PAHs by EPA Method 8270, and for 8 RCRA Metals by EPA Method 6010/7470-7471. Soil sample analytical results were compared to the VAP Generic Direct Contact Standards for Residential Land Use, Commercial/Industrial Work, and Construction/Excavation Worker.

Four (4) metals were detected in soil samples B-5, B-7, and B-10 collected from this area. Metals detected include arsenic, barium, chromium, and lead. No metals were detected in exceedance of the VAP direct contact standards.

One (1) PAH, chrysene, was detected in soil sample B-7 at 0.0673 mg/kg. Chrysene detected at a level in exceedance of the VAP direct contact standards.

Three (3) VOCs included 1,2,4-trimethylbenzene, toluene, and xylenes were detected in soil sample B-7. Toluene was also detected in soil sample B-10. VOCs were not detected in exceedance of the VAP direct contact standards. Data results are included in **Table 1**.

Findings and Conclusions

During geotechnical boring installation and soil sample collection activities, geologic units were logged. Fill material consisting of black fine to coarse sand, silt, slag, and cinders were observed to depths between ten (10) and twenty-five (25) feet below ground surface across the sampling locations. Brown fine grained sand and silt or silty clay and sand was observed below the fill material to depths between twenty (20) and thirty-five (35) feet bgs. Brown and gray sand and sandstone fragments were observed below to a depth of between twenty-five (25) and forty-five (45) feet bgs. Gray, fine-grained, well-sorted, well-rounded, porous, permeable, mildly weathered sandstone was observed at between thirty-five (35) and fifty-five (55) feet below ground surface and coarsened with depth to approximately fifty-eight (58) feet bgs. Sandstone in borings B-5 and B-7 was observed at twelve (12) feet below ground surface to depths between nineteen (19) and twenty-four (24) feet bgs.

The purpose of this report was to review previous environmental investigations to evaluate the data and conclusions produced and to collect additional data within geotechnical borings to be applied to the specific work being proposed for the site. The need for soil and groundwater management strategies for construction were also evaluated. Chemicals of concern were not detected at levels in exceedance of direct contact standards which would warrant special handling or disposal requirements during the assessment.

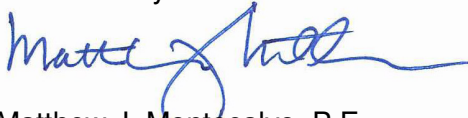
However, information was provided that suggested that environmental impacts may be present on one of the sites (i.e., the Schipper Property West of Bridge 1). A former diesel UST and a former diesel AST were located along the southern property boundary of 473 South High Street. The proposed alignment passes through the former location of these tanks. Geotechnical borings were not installed and soil samples were not collected in this area during this assessment. Environmental Design Group recommends soil and groundwater management strategies be established and implemented if excavation activities are conducted in this area. Depending on the level of impacts to soil and groundwater, management strategies may include excavation and off-site disposal of impacted soil and collection and off-site disposal of groundwater encountered during construction at a licensed disposal facility. Alternatively, additional environmental investigation could be conducted within the planned alignment of the trail to assess whether trail construction or trail users may be affected by environmental impacts resulting from the past use of this property.

Environmental Design Group appreciates this opportunity to provide services to ms consultants, inc. in providing this report.



Tiffany Thoma, P.E.
Project Engineer

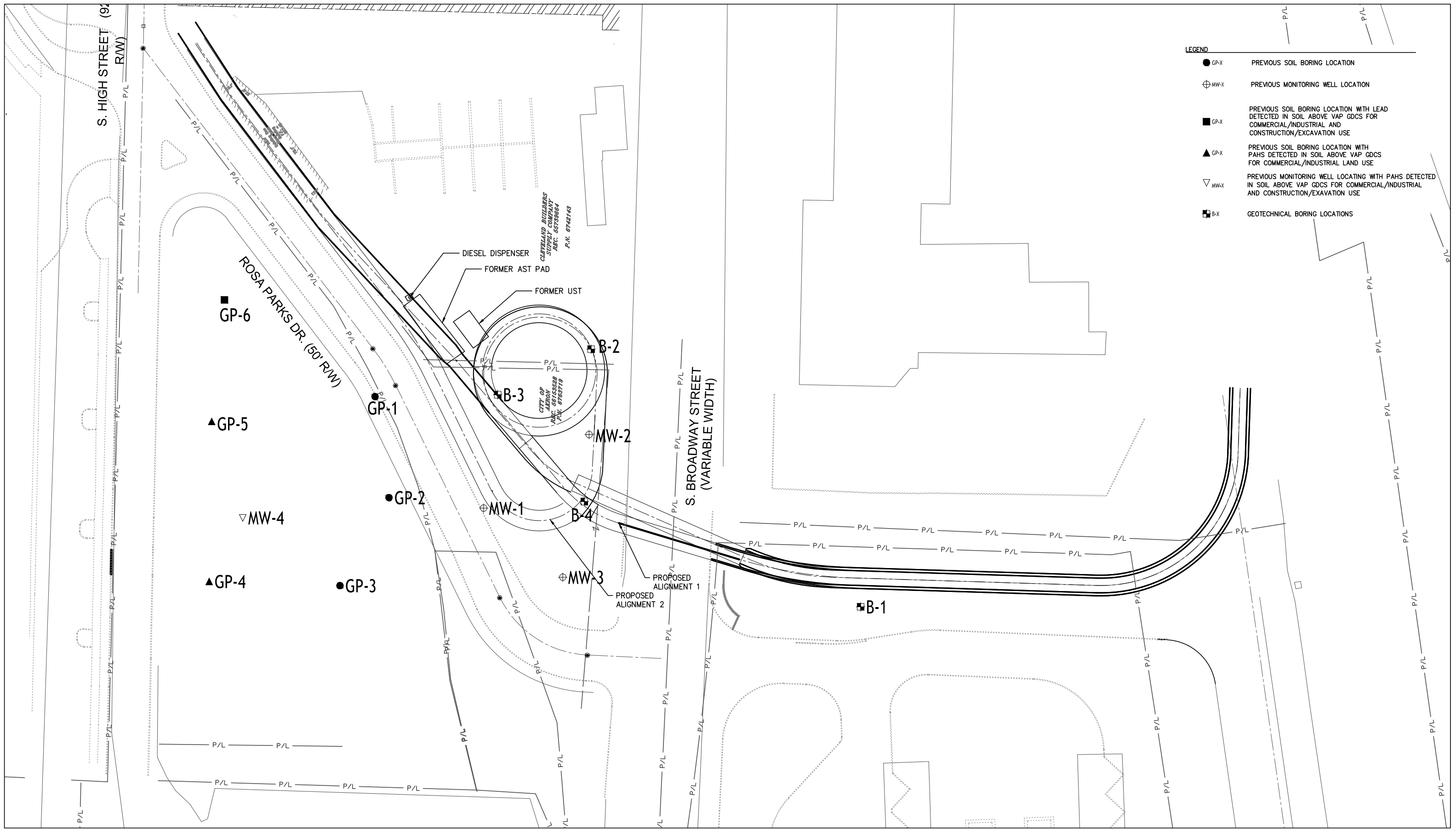
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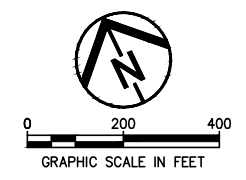
Matthew J. Montecalvo, P.E.
Director of Environmental Services

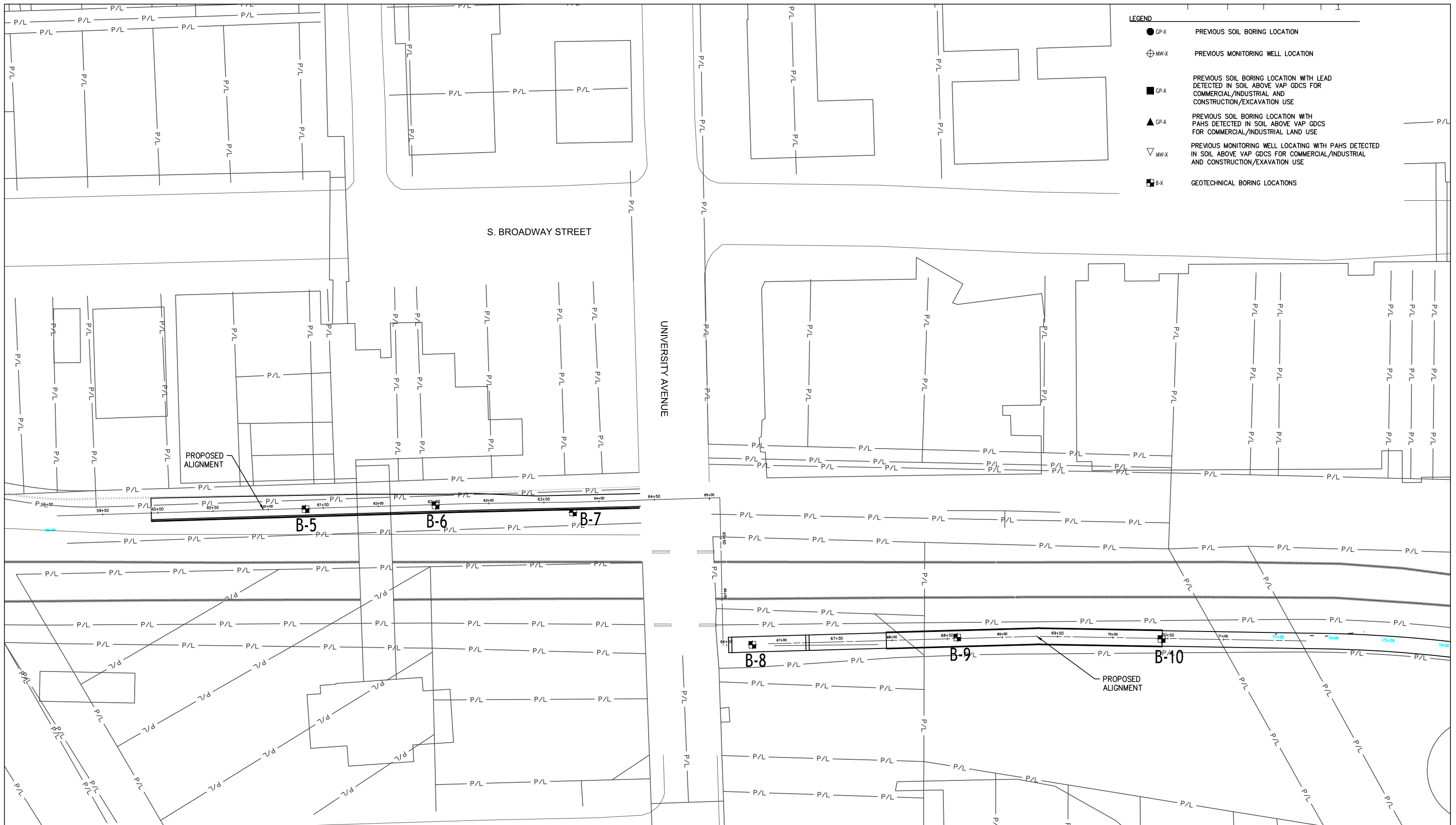
Figures



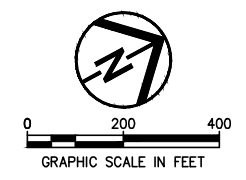


BORING LOCATION MAP
FIGURE 1
 BRIDGE 1 AREA





BORING LOCATION MAP
FIGURE 2
 BRIDGES 2 AND 3 AREA



Tables

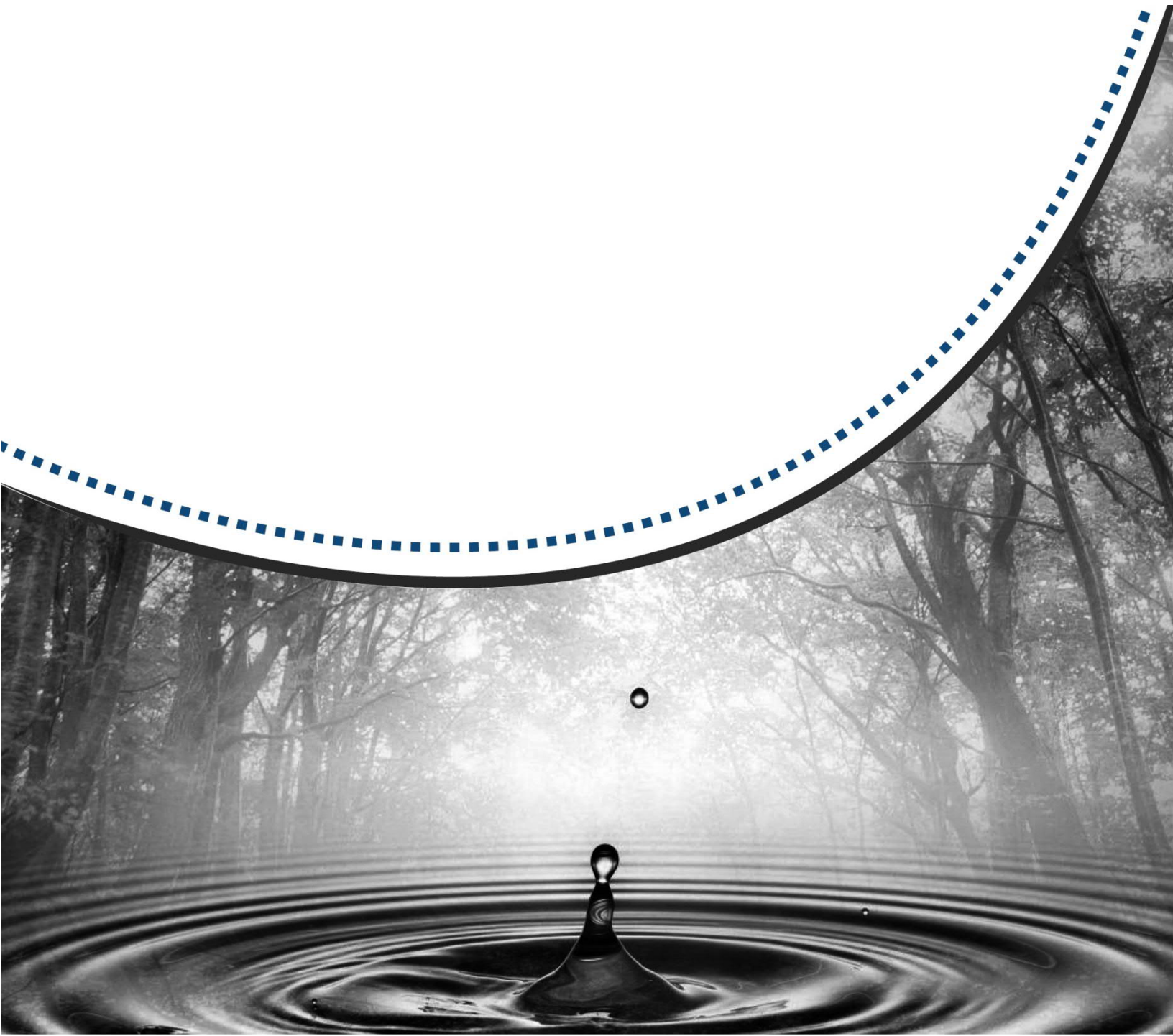


TABLE 1
Soil Analytical Results from Geotechnical Investigation
Freedom Trail, Phase IV

Parameter	Units	VAP Residential Generic Direct Contact Soil Standard	VAP Commercial Industrial Generic Direct Contact Soil Standard	VAP Construction Generic Direct Contact Soil Standard						
					B-1 (0-2')	B-2 (0-2')	B-3 (0-2')	B-5 (0-2')	B-7 (0-2')	B-10 (0-2')
METALS					10/20/2016	10/14/2016	10/17/2016	10/24/2016	10/24/2016	10/26/2016
Arsenic	mg/kg	12	77	690	7.15	6.54	10.1	4.78	8.01	11.1
Barium	mg/kg	30,000 ¹	680,000 ¹	320,000 ¹	85.2	46.1	120	78.4	18	24.1
Cadmium	mg/kg	140	2,600	1,000	<1.10	<1.12	<1.31	<1.01	<1.09	<0.891
Chromium	mg/kg	24	210	1,200	10.8	7.06	18.2	7.09	6.07	8.63
Lead	mg/kg	400	800	400	24.2	<5.58	<6.54	<5.06	5.83	5.18
Mercury	mg/kg	3.1	3.1	3.1	<0.228	<0.227	<0.267	<0.169	<0.185	<0.207
Selenium	mg/kg	780	20,000	11,000	<2.75	<2.79	<3.27	<2.53	<2.73	<2.23
Silver	mg/kg	780	20,000	11,000	<2.75	<2.79	<3.27	<2.53	<2.73	<2.23
PAHs										
Acenaphthene	mg/kg	6,900	90,000	780,000	<0.177	<0.876	<1.00	<0.318	<0.178	<0.160
Acenaphthylene	mg/kg	6,900	90,000	780,000	<0.177	<0.876	<1.00	<0.318	<0.178	<0.160
Anthracene	mg/kg	34,000	450,000	1,000,000	<0.177	<0.876	<1.00	<0.318	<0.178	<0.160
Benzo(a)anthracene	mg/kg	12	58	1,200	<0.129	<0.642	<0.733	<0.233	<0.131	<0.118
Benzo(a)pyrene	mg/kg	1.2	5.8	120	<0.194	<0.193	<0.220	<0.0699	<0.196	<0.0353
Benzo(b)fluoranthene	mg/kg	12	58	1,200	<0.883	<0.876	<1.00	<0.318	<0.891	<0.160
Benzo(g,h,i)perylene	mg/kg	3,400	45,000	390,000	<0.883	<0.876	<1.00	<0.318	<0.891	<0.160
Benzo(k)fluoranthene	mg/kg	120	580	12,000	<0.194	<0.193	<0.220	<0.0699	<0.196	<0.0353
Chrysene	mg/kg	1,200	5,800	120,000	0.0969	<0.193	<0.220	<0.0699	0.0673	<0.0353
Dibenz(a,h)anthracene	mg/kg	1.2	5.8	120	<0.194	<0.193	<0.220	<0.0699	<0.196	<0.0353
Fluoranthene	mg/kg	4,600	60,000	160,000	<0.177	<0.876	<1.00	<0.318	<0.178	<0.160
Fluorene	mg/kg	4,600	60,000	520,000	<0.177	<0.876	<1.00	<0.318	<0.178	<0.160
Indeno(1,2,3-cd)pyrene	mg/kg	12	58	1,200	<0.194	<0.193	<0.220	<0.0699	<0.196	<0.0353
Naphthalene	mg/kg	90	450	560	<0.177	<0.876	<1.00	<0.318	<0.178	<0.160
Pyrene	mg/kg	3,400	45,000	390,000	<0.177	<0.876	<1.00	<0.318	<0.178	<0.160
VOCs										
1,1,1,2-Tetrachloroethane	mg/kg	46	240	680	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
1,1,1-Trichloroethane	mg/kg	640	640	640	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
1,1,2,2-Tetrachloroethane	mg/kg	14	75	670	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
1,1,2-Trichloroethane	mg/kg	26	140	1200	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
1,1-Dichloroethane	mg/kg	83	420	1700	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
1,1-Dichloroethene	mg/kg	360	1200	360	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
1,1-Dichloropropene	mg/kg	-	-	-	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
1,2,3-Trichlorobenzene	mg/kg	-	-	-	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
1,2,3-Trichloropropane	mg/kg	-	-	-	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
1,2,4-Trichlorobenzene	mg/kg	150	400	400	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
1,2,4-Trimethylbenzene	mg/kg	160	220	220	0.00798	<0.00586	<0.00667	<0.00536	0.00816	<0.00544
1,2-Dibromo-3-chloropropane	mg/kg	0.34	1.7	15	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
1,2-Dibromoethane	mg/kg	0.83	4.4	38	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
1,2-Dichlorobenzene	mg/kg	380	380	380	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
1,2-Dichloroethane	mg/kg	11	56	480	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
1,2-Dichloropropane	mg/kg	23	120	180	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
1,3,5-Trimethylbenzene	mg/kg	180 ¹	180 ¹	180 ¹	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
1,3-Dichlorobenzene	mg/kg	-	-	-	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
1,3-Dichloropropane	mg/kg	1500	1500	1500	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
1,4-Dichlorobenzene	mg/kg	61	310	2600	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
2,2-Dichloropropane	mg/kg	-	-	-	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
2-Chlorotoluene	mg/kg	-	-	-	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
4-Chlorotoluene	mg/kg	-	-	-	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Benzene	mg/kg	26	140	1200	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Bromobenzene	mg/kg	-	-	-	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Bromochloromethane	mg/kg	-	-	-	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Bromodichloromethane	mg/kg	6.8	35	300	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Bromoform	mg/kg	1200	6200	130000	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Bromomethane	mg/kg	18	82	550	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Carbon tetrachloride	mg/kg	15	79	460	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Chlorobenzene	mg/kg	700	760	760	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Chloroethane	mg/kg	2100	2100	2100	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Chloroform	mg/kg	7.4	38	320	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Chloromethane	mg/kg	300	1300	1300	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
cis-1,2-Dichloroethene	mg/kg	-	-	-	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Isopropylbenzene	mg/kg	-	-	-	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Dibromomethane	mg/kg	1600	2800	2800	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Dichlorodifluoromethane	mg/kg	850	850	850	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Ethylbenzene	mg/kg	130	480	480	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Hexachlorobutadiene	mg/kg	120	630	1,400	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
m,p-Xylene	mg/kg	-	-	-	<0.00588	<0.0117	<0.0133	<0.0107	<0.0119	<0.0109
Methylene Chloride	mg/kg	750	3300	3300	<0.00588	<0.0293	<0.0133	<0.0268	<0.0297	<0.0272
n-Butylbenzene	mg/kg	110 ¹	110 ¹	110 ¹	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
n-Propylbenzene	mg/kg	260 ¹	260 ¹	260 ¹	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
o-Xylene	mg/kg	-	-	-	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
p-Isopropyltoluene	mg/kg	160 ¹	160 ¹	160 ¹	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
sec-Butylbenzene	mg/kg	140 ¹	140 ¹	140 ¹	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Styrene	mg/kg	870	870	870	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
tert-Butylbenzene	mg/kg	-	-	-	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Tetrachloroethene	mg/kg	170	170	170	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Toluene	mg/kg	820	820	820	0.0138	<0.00586	<0.00667	<0.00536	0.0205	0.0102
trans-1,2-Dichloroethene	mg/kg	370	1700	1700	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Trichloroethene	mg/kg	11	51	17	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Trichlorofluoromethane	mg/kg	1200	1200	1200	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Vinyl chloride	mg/kg	1.3	50	280	<0.00588	<0.00586	<0.00667	<0.00536	<0.00594	<0.00544
Xylene (Total)	mg/kg	260	260	260	0.00879	<0.00586	<0.00667	<0.00536	0.0117	<0.00544

NOTE: N/A = not analyzed

Bold indicates a detection

*Since a standard does not exist for total Chromium the standard for Chromium VI was used.

1- OHIO EPA - VOLUNTARY ACTION PROGRAM CHEMICAL INFORMATION DATABASE AND APPLICABLE REGULATORY STANDARDS (CIDARS) Supplemental Criteria, current as of June 15, 2015

Appendix A



SUBSURFACE INVESTIGATION
FOR THE
SUMMIT METRO PARKS FREEDOM TRAIL PHASE IV
AKRON, OHIO

Prepared for Summit Metro Parks

December 7, 2016

December 7, 2016

Summit Metro Parks
975 Treaty Line Road
Akron, Ohio 44313

Attention: Charles Hauber, P.E., P.S.

SUBJECT: Summit Metro Parks Freedom Trail IV, Akron, Ohio;
TGG# 161158

Mr. Hauber,

This report presents the results of a subsurface investigation performed for the subject project. The purposes of our investigation were to define the general subsurface conditions for the new bridges, and to provide recommendations for design and construction of the foundation. The final design of the bridge structures were not completed at the time of this report.

PROJECT DESCRIPTION

One of the proposed bridge structures will be located over South Broadway, directly north of Rosa Parks Drive, in Akron, Ohio. The bridge will support pedestrian and bike traffic and will have an overall length of approximately 500 feet. The final design of the structure was not completed at the time of this report.

The other structure will be located on CSX railroad easement north and south of the University Avenue Bridge. The structure will start at the railroad grade about 400 feet north of University Avenue on the east side of the railroad, and will ramp up to the north side of the existing University bridge which will provide passage across the railroad. A new structure will then ramp down south of University Avenue along the west side of the tracks, reaching railroad grade about 400 feet south of University Avenue. The north ramp structure will have a bridge directly north of University Avenue, with the remaining portion being a Mechanically Stabilized Earth (MSE) Wall. The MSE ramp section will be 14 feet wide with a maximum height of 17 feet off the existing ground. The south ramp will be a MSE wall structure the entire length. The height of the wall near University Avenue will be 30 feet above the existing grade.

FIELD AND LABORATORY INVESTIGATION

Seven (7) test borings were advanced at the project sites between October 14 and 26, 2016 using a medium capacity rotary drill rig. Three (3) Wildcat Dynamic Cone penetration tests were performed at the test locations north of University Avenue on the CSX easement where the drill rig could not access the test locations. The location of the borings were selected by others and field located by our personnel as shown on the attached Location Plan.

Standard penetration sampling and NX rock coring was performed at the depth intervals shown on the attached Test Boring Logs, with all samples visually classified in the field, and delivered to our office. The samples were again examined by one of our geotechnical engineers, with the resulting descriptions appearing on the logs. An 80.6% or 79.2% efficient automatic hammer was utilized, with corrected N_{60} values shown on the logs. Water level readings and hole depth soundings were made on completion of each boring, followed by backfilling the holes. Ground surface elevations listed on the soil borings were estimated off Google Earth. Further information pertaining to field testing and sampling procedures is attached.

LABORATORY TESTING

After examination of the recovered samples by an engineer, the laboratory testing program was developed. Tests were performed as follows:

Test	ASTM #	Quantity
Moisture Content	D-2216	13
Atterberg Limits	D-4318	5
Sieve Analysis	D-422	5
Unconfined Rock Compression Test	D-2938	3

Laboratory results are shown on the attached test boring logs or lab data sheets.

SUBSURFACE CONDITIONS

Test boring data collected at the site indicate the subsurface to be composed of fill and sand soils over sedimentary bedrock. These can be described for engineering purposes as the following for each site:

SUBSURFACE CONDITIONS, continued.

South Broadway Bridge

In Test Boring B-1, topsoil was present to 8 inch depth. Borings B-2, B-3, and B-4 had no significant topsoil layer.

Underlying the topsoil layer where present and continuing to 11 to 27 feet were fill soils. The fill consisted of sand with various amounts of cinders, slag, silt, and gravel. Where tested the fill was damp to moist and loose to very dense. It should be noted that rubble fill was encountered during our previous work and the nearby new Akron AAA building.

Organic peat soils were encountered in Borings B-2 and B-3 in the 11.0 to 12.5 feet sampling interval and B-4 in the 13.5 to 15.0 sampling interval.

Below the fill or peat soils where present and continuing to 32 to 48 feet were sandy soils with some layering of clay. Where tested the sandy soils were wet and loose to very dense. The clayey layers were wet and medium stiff.

Sedimentary bedrock was encountered at a depth of 32 to 48 feet below the ground surface. At all test locations the bedrock consisted of compact sandstone. In Boring B-2 and B-4, shale bedrock was found below the sandstone.

The subsurface conditions indicated that the groundwater is at a depth of 6 to 12 feet the ground for Borings B-2, B-3, and B-4. The groundwater is near 27 feet depth for Boring B-1.

University Avenue Ramp Structures

On the south side of University Avenue 8 to 12 inches of asphalt was present. On the north side, less than 12 inches of topsoil was present.

Underlying the surface soils and continuing to 3 to 11 feet was silt, sand with layering of clay. Where tested the silt and sand soils were moist to wet and loose to medium dense. The clayey soils were moist and medium stiff to stiff.

Sandstone bedrock was encountered below the soil where tested. The sandstone was compact and mildly weathered where sampled. It should be noted that the bedrock depth on the north side of the University Avenue was estimated by performing a dynamic cone penetration test and was not visually identified.

SUBSURFACE CONDITIONS, continued.

Wet soil seams were present in Boring B-5 and B-6 at a depth of 6.0 feet. At test location B-10, the soil was wet at 1.5 feet.

RECOMMENDATIONS

Based on our analysis of the subsurface conditions encountered at the locations indicated, and the assumption that conditions across the construction site are similar to those known, we offer the following for your consideration:

Design Soil Parameters

Boring B-1
 Elevation=±987'
 Groundwater=960'

Depth, Feet	Undrained Cohesion	Internal Friction Angle	Modulus of Subgrade Reaction*	Unit Weight
0-27	---	20°	50 pci	120 pcf
27-48	---	32°	200 pci	120 pcf
48+	---	45°	1500 pci	140 pcf

Boring B-2

Elevation=±966'
 Groundwater=960'

Depth, Feet	Undrained Cohesion	Internal Friction Angle	Modulus of Subgrade Reaction*	Unit Weight
0-11	---	20°	50 pci	120 pcf
11-17	---	0°	0 pci	65 pcf
17-22	750 psf	--	150 pci	120 pcf
22-32	---	35°	350 pci	130 pcf
32+	---	45°	1500 pci	140 pcf

RECOMMENDATIONS, continued.

Boring B-3

Elevation=±965'
 Groundwater=957'

Depth, Feet	Undrained Cohesion	Internal Friction Angle	Modulus of Subgrade Reaction*	Unit Weight
0-11	---	20°	50 pci	120 pcf
11-13	---	0°	0 pci	65 pcf
13-22	---	28°	100 pci	120 pcf
22-27	750 psf	--	150 pci	120 pcf
27-33	---	28°	100 pci	120 pcf
33+	---	45°	1500 pci	140 pcf

Boring B-4

Elevation=±969'
 Groundwater=957'

Depth, Feet	Undrained Cohesion	Internal Friction Angle	Modulus of Subgrade Reaction*	Unit Weight
0-13	---	20°	50 pci	120 pcf
13-17	---	0°	0 pci	65 pcf
17-23	---	28°	100 pci	120 pcf
23-27	---	32°	200 pci	120 pcf
27-37	---	42°	500 pci	130 pcf
37+	---	45°	1500 pci	140 pcf

Boring B-5

Elevation=±996'
 Groundwater=N/A

Depth, Feet	Undrained Cohesion	Internal Friction Angle	Modulus of Subgrade Reaction*	Unit Weight
0-8	---	29°	75 pci	120 pcf
8-11	750 psf	--	150 pci	120 pcf
11+	---	45°	1500 pci	140 pcf

RECOMMENDATIONS, continued.

Boring B-6

Elevation=±996'
 Groundwater=N/A

Depth, Feet	Undrained Cohesion	Internal Friction Angle	Modulus of Subgrade Reaction*	Unit Weight
0-8	---	29°	75 pci	120 pcf
8-11	750 psf	--	150 pci	120 pcf
11+	---	45°	1500 pci	140 pcf

Boring B-7

Elevation=±997'
 Groundwater=N/A

Depth, Feet	Undrained Cohesion	Internal Friction Angle	Modulus of Subgrade Reaction*	Unit Weight
0-3	---	28°	50 pci	120 pcf
3-6	1000 psf	--	200 pci	120 pcf
6+	---	45°	1500 pci	140 pcf

Boring B-8

Elevation=±997'
 Groundwater=N/A

Depth, Feet	Undrained Cohesion	Internal Friction Angle	Modulus of Subgrade Reaction*	Unit Weight
0-1	---	--	0 pci	120 pcf
1-5	---	32°	200 pci	120 pcf
5+	---	45°	1500 pci	140 pcf

RECOMMENDATIONS, continued.

Boring B-9

Elevation=±998'
Groundwater=N/A

Depth, Feet	Undrained Cohesion	Internal Friction Angle	Modulus of Subgrade Reaction*	Unit Weight
0-1	---	--	0 pci	120 pcf
1-5	---	32°	200 pci	120 pcf
5+	---	45°	1500 pci	140 pcf

Boring B-10

Elevation=±998'
Groundwater=N/A

Depth, Feet	Undrained Cohesion	Internal Friction Angle	Modulus of Subgrade Reaction*	Unit Weight
0-1	---	--	0 pci	120 pcf
1-3	---	32°	200 pci	120 pcf
3+	---	45°	1500 pci	140 pcf

* Modulus of subgrade reaction values are for use in "Lpile" computer analyses, and for lateral resistance determinations only.

** Sandstone bedrock will need to be verified in the field for test locations B-8, B-9, and B-10.

Foundations

The foundation system for both sites should bear on the sedimentary bedrock or suitable bearing materials. Due to the depth of the suitable bearing soils/rock found at the South Broadway Bridge, the foundation system should consist of Driven H-Piles or Drilled Piers. The bedrock and suitable bearing soils are relatively shallow near University Avenue structures which suggest that the foundation system should consist of drilled piers or shallow foundations. We provide alternative foundation options for your consideration:

RECOMMENDATIONS, continued.

South Broadway Bridge H-Pile Option

The bridge foundations can be designed to be supported by a deep foundation system that is end bearing on compact sedimentary bedrock. The piles should consist of HP10x42 piles with steel pile points. The installed piles could be dynamic load tested (CMS 523) to verify pile design and to aid in reducing the risk of pile damage during installation if the ODOT design requirements are to be followed.

Test Location	Tip Elevation Feet	Nominal Pile Side Resistance R_s (Kips)	Nominal Tip Resistance R_p (Kips)	Ultimate Bearing Value R_{ndr} (Kips)
B-1	+938	88	132	220
B-2	+934	53	167	220
B-3	+932	63	157	220
B-4	+932	77	143	220

The ultimate bearing value is based on the yield strength of the pile steel being 36 ksi refusing on bedrock. The actual available tip resistance is higher than the reported values, but is limited by the structural capacity of the pile. The bearing resistance factor ϕ_{stat} should be 0.5 for design. The piles should be spaced center to center not less than 30 inches.

The uplift resistance of a single pile should be taken as the Nominal Pile Side Resistance with a Resistance factor ϕ_{up} of 0.25. It should be noted that the length of the production piles may be less than the anticipated embedment length given and should be accounted for in the final design.

The above values and factors are based on LRFD design.

Drilled Piers

The bridge foundations for both locations can be designed to be supported by a deep foundation system using drilled piers that are end bearing in compact sedimentary bedrock or suitable bearing materials as detailed below. Due to the varying depths of the sandstone and suitable soils for the piers we provided a table for the design values of each test locations.

RECOMMENDATIONS, continued.

Boring B-1

Depth, Feet	Ultimate Bearing Capacity	Ultimate Side Shear, Compression	Ultimate Side Shear, Uplift
0-27	---	---	---
27-48	12,000 psf	900 psf	600 psf
48+	50,000 psf	6,000 psf	4,000 psf

Boring B-2

Depth, Feet	Ultimate Bearing Capacity	Ultimate Side Shear, Compression	Ultimate Side Shear, Uplift
0-11	---	---	---
11-17	0 psf	0 psf	0 psf
17-22	6,000 psf	560 psf	375 psf
22-32	12,000 psf	1,100 psf	750 psf
32+	50,000 psf	6,000 psf	4,000 psf

Boring B-3

Depth, Feet	Ultimate Bearing Capacity	Ultimate Side Shear, Compression	Ultimate Side Shear, Uplift
0-11	---	---	---
11-13	0 psf	0 psf	0 psf
13-22	6,000 psf	500 psf	335 psf
22-27	6,000 psf	550 psf	360 psf
27-33	6,000 psf	850 psf	560 psf
33+	50,000 psf	6,000 psf	4,000 psf

Boring B-4

Depth, Feet	Ultimate Bearing Capacity	Ultimate Side Shear, Compression	Ultimate Side Shear, Uplift
0-13	---	---	---
13-17	0 psf	0 psf	0 psf
17-23	6,000 psf	500 psf	335 psf
23-27	12,000 psf	1,000 psf	660 psf
27-37	16,000 psf	1,200 psf	800 psf
37+	50,000 psf	6,000 psf	4,000 psf

RECOMMENDATIONS, continued.

Boring B-5

Depth, Feet	Ultimate Bearing Capacity	Ultimate Side Shear, Compression	Ultimate Side Shear, Uplift
0-3	---	---	---
3-8	6,000 psf	230 psf	150 psf
8-11	6,000 psf	550 psf	360 psf
11+	50,000 psf	6,000 psf	4,000 psf

Boring B-6

Depth, Feet	Ultimate Bearing Capacity	Ultimate Side Shear, Compression	Ultimate Side Shear, Uplift
0-3	---	---	---
3-8	6,000 psf	230 psf	150 psf
8-11	6,000 psf	550 psf	360 psf
11+	50,000 psf	6,000 psf	4,000 psf

Boring B-7

Depth, Feet	Ultimate Bearing Capacity	Ultimate Side Shear, Compression	Ultimate Side Shear, Uplift
0-3	---	---	---
3-6	6,000 psf	750 psf	250 psf
6+	50,000 psf	6,000 psf	4,000 psf

Boring B-8

Depth, Feet	Ultimate Bearing Capacity	Ultimate Side Shear, Compression	Ultimate Side Shear, Uplift
0-3	---	---	---
3-5	12,000 psf	230 psf	150 psf
5+	50,000 psf	6,000 psf	4,000 psf

Boring B-9

Depth, Feet	Ultimate Bearing Capacity	Ultimate Side Shear, Compression	Ultimate Side Shear, Uplift
0-3	---	---	---
3-5	12,000 psf	230 psf	150 psf
5+	50,000 psf	6,000 psf	4,000 psf

RECOMMENDATIONS, continued.

Boring B-10

Depth, Feet	Ultimate Bearing Capacity	Ultimate Side Shear, Compression	Ultimate Side Shear, Uplift
0-3	---	---	---
3-5	16,000 psf	230 psf	150 psf
5+	50,000 psf	6,000 psf	4,000 psf

For uplift calculations, the ultimate uplift capacity should not exceed the weight of a volume of material of an inverted cone whose sides extend up from the base of the pier at a 60° angle measured from the horizontal. An average unit weight of 125 pcf should be used for this calculation.

No group reduction factor is needed where the center to center spacing of piers exceeds 4 times the pier diameter. A reduction factor of 0.65 would apply when the center to center spacing is reduced to 2.5, which is the minimum pier spacing. A linear correlation would apply for spacings between 2.5 and 4.

During construction, all pier bottoms should be clean and inspected by an on-site geotechnical engineer or their representative prior to concrete placement, which should occur as soon after excavation as possible. Temporary casing should be used as necessary for sidewall stability, and any water accumulating in the shafts should be removed prior to concreting.

Shallow Foundations

A shallow foundation system can be used to support portions of the MSE ramp structures near University Avenue. The ultimate bearing capacities for each test location is provided under the Drilled Pier section above. The allowable bearing capacity for the foundations should have a factor of safety greater than 2.5.

It should be noted that the actual bearing pressure on the northern portion of the south ramp (Structure No. 2) will greatly exceed the allowable bearing capacity of the soils. The site subsoils would need to be improved under the foundations/wall to support the new loadings or a structural mat and drilled piers could be constructed. Soil improvements could include installing rammed aggregate piers and/or controlled modulus columns below the structure. These subsoil improvements will provide stiffened zones below the structure, and will densify the surrounding soils. Two such systems we are familiar with were developed by the Geopier Foundation Company and Menard USA. The foundations

RECOMMENDATIONS, continued.

can be designed based on a relatively higher allowable bearing pressure. The actual bearing capacity of the improved subgrade bearing soils would be determined by the design company.

A settlement analysis of the MSE walls with the anticipated loadings indicated that the maximum deflection of less than 1 inch is anticipated for the south MSE ramp structure (Structure No. 2) and 0.5 inches for the north MSE ramp structure (Structure No.3). The settlement analysis were based upon estimated coefficients of the existing subgrade soils and the structural drawings dated November 29, 2016.

The MSE ramp structure should be designed for sliding using a friction coefficient of 0.35 with a maximum shear value of 500 psf. Greater resistance might be available after ground improvement.

The Global Stability of the south ramp structure (Structure No. 2) was performed using Limit State Geo software. The factor of safety of the proposed MSE structure is less than 1 where the height of the wall is greater than 25 feet high, between 1 to 1.5 when the height of the wall is between 20 and 25 feet, and greater than 1.5 when the wall height is less than 20 feet tall. The subgrade soils would need to be improved where the wall height is greater than 20 feet or where the bearing capacity is too high.

The north MSE ramp structure (Structure No. 3) has no external lateral earth loads since both sidewalls are exposed to air. The allowable bearing capacity will control the design of the foundations.

As indicated above, the current subgrade soils for South Broadway Bridge (Structure No.1) are unsuitable to support shallow foundations. The subgrades could possibly be improved using controlled modulus columns. Shallow foundations could then be constructed over the improved subgrade soils. The design of subgrade improvements would be performed by Menard USA.

Seismic Considerations

Based upon the typical subsurface soil profile found in the test borings, combined with our knowledge of the geology of the site, an earthquake site class definition "C" should be used for design of the structure.

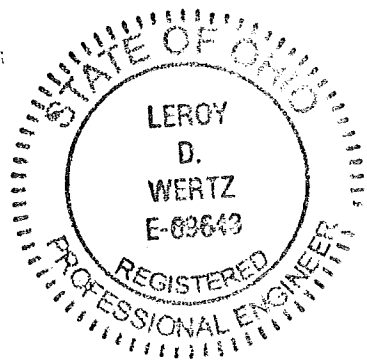
LIMITATIONS

The conclusions and recommendations presented herein are based on the project information being as presented. Should any of this information be incorrect, our recommendations would be invalidated until we have reviewed such changes as they pertain to the subsurface conditions.

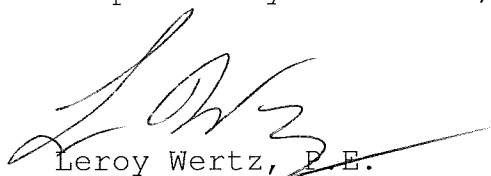
The recommendations given above also assume a uniformity of soil and rock conditions between and away from the test positions. If during construction, any conditions different from those found in this investigation are evident, we should be immediately notified. After observing the exposed conditions, we will advise you of any modifications to our conclusions and recommendations deemed necessary.

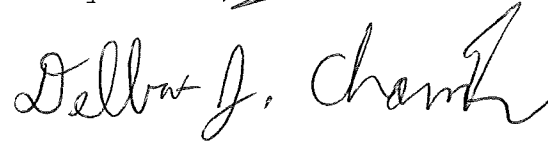
Any conclusions drawn by others from the data presented in this report are their responsibility.

We hope you will find this report satisfactory. Kindly contact our office with any questions you might have regarding this submittal, or if we may be of further service.

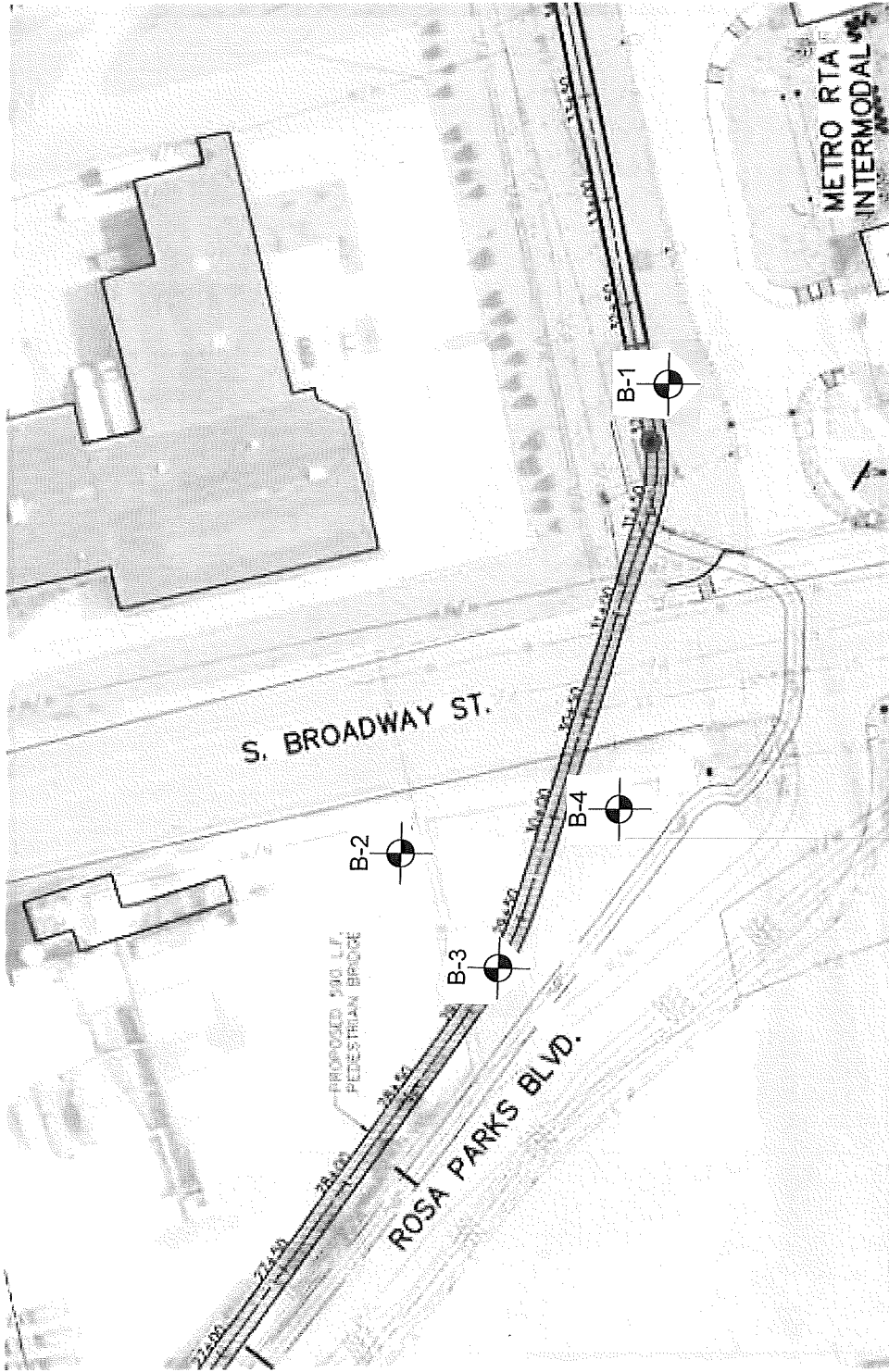


Respectfully submitted,


Leroy Wertz, P.E.


Delbert J. Channels, P.E.
Reviewing Engineer

LOCATION PLAN



PROJECT: Summit Metro Parks Freedom Trail Phase IV
PROJECT NUMBER: 161158
LOCATION: South Broadway Street, Akron, Ohio

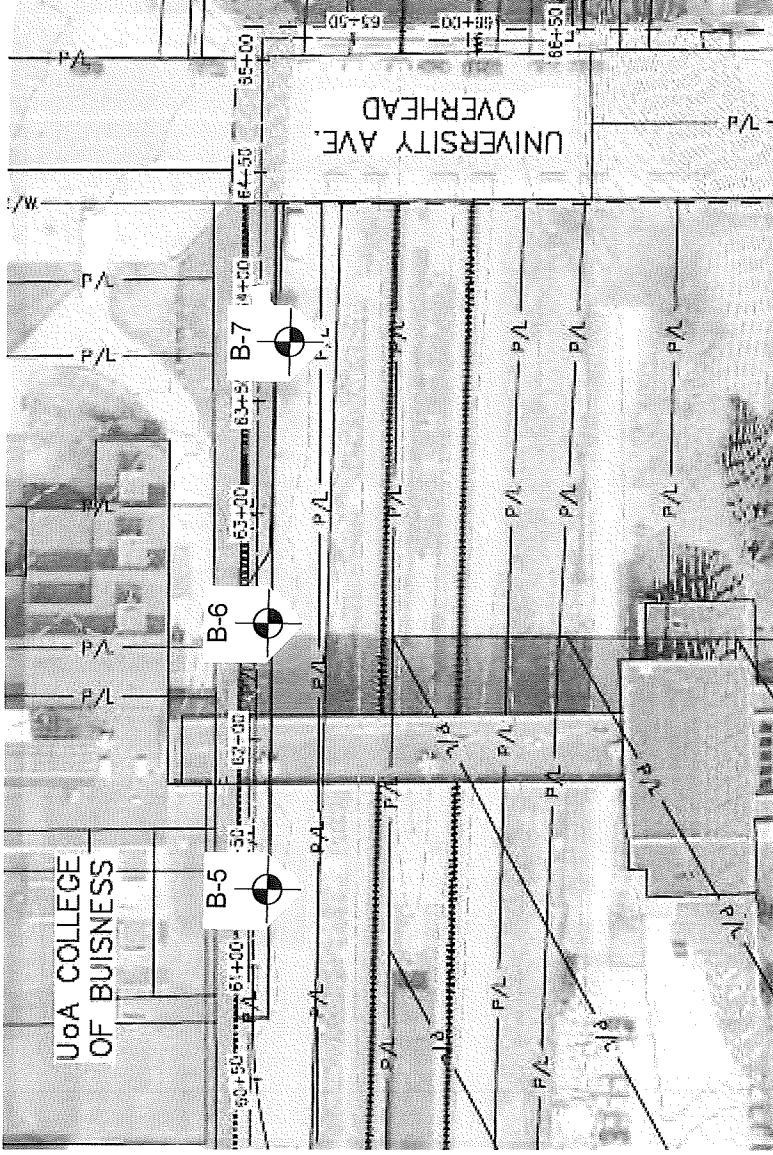
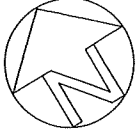
DATE: 11/11/16

TIMMERMAN
GEOTECHNICAL GROUP, INC.

Not to Scale

2685 Gilchrist Road ♦ Akron, Ohio 44305 ♦ (330) 733-6748

LOCATION PLAN



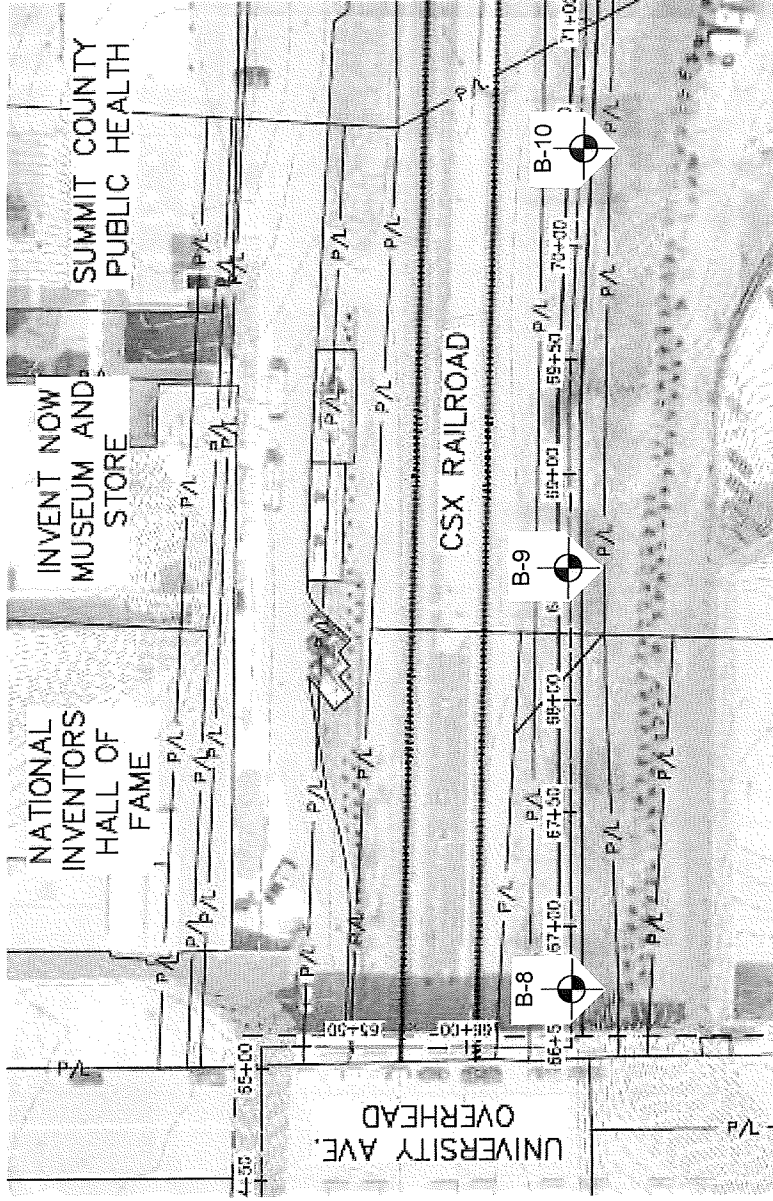
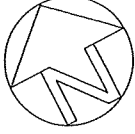
PROJECT: Summit Metro Parks Freedom Trail Phase IV
PROJECT NUMBER: 161158
DATE: 11/11/16
LOCATION: University Avenue, Akron, Ohio

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LOCATION PLAN



PROJECT: Summit Metro Parks Freedom Trail Phase IV
 PROJECT NUMBER: 161158 DATE: 11/11/16
 LOCATION: University Avenue, Akron, Ohio

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FIELD DRILLING AND SAMPLING PROCEDURE

All test borings were advanced using a medium capacity truck mounted rotary drill. The boring method and hole diameter are so indicated on the respective Test Boring Logs.

Disturbed samples, designated "SS", were obtained using a 2-inch O.D. by 1-3/8 inch I.D. split spoon sampler. Driving of the sampling device was performed in accordance with ASTM D-1586, in which a 140 lb. hammer is freely dropped from a height of 30 inches. Recovery of the samples was also in accordance with ASTM D-1586.

The three numbers recorded in the 'Blows/6"' column on the Test Boring Logs were obtained during sampling and refer to the Standard Penetration Tests (ASTM D-1586). These numbers are the number of blows of the 140 lb. hammer per above required to penetrate each 6 inches (unless otherwise indicated) of the sample length with the split spoon sampler. The sum of the blows required to penetrate the second and third 6-inch intervals is termed the Standard Penetration Resistance "N", which is indicative of the relative density or consistency of the soil penetrated. The first 6-inch "seating penetration" is normally disregarded for engineering purposes.

Undisturbed samples, where taken are represented on the Test Boring Logs by "ST". A thinwall sampler was pushed into the soil, and the resulting sample sealed within the tube. Procedures followed in undisturbed sampling are outlined in ASTM D-1587.

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ABBREVIATIONS AND SYMBOLS USED ON TEST BORING LOGS

Sampling Method Abbreviations


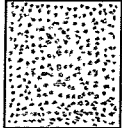

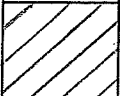
SS: Split spoon sampler, 2" O.D. by 1-3/8" I.D. (ASTM D-1586)*
 ST: Shelby tube sampler, 3" O.D. by 2-7/8" I.D. (ASTM D-1587)
 ST2: Shelby tube sampler, 2" O.D. by 1-7/8" I.D. (ASTM D-1587)
 NX: Rock core, 2-1/8" diameter (ASTM D-2113)



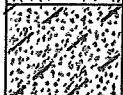
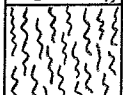
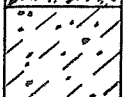
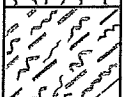
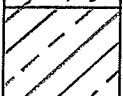
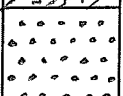
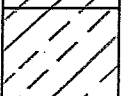

* ASTM D-1586, the Standard Penetration Test, utilizes a 140 lb. hammer dropped 30" to drive the split spoon sampler.

Miscellaneous Abbreviations

: Groundwater level at completion of boring
 Rec: Recovered length of sample
 Wn: Natural moisture content, ratio of the weight of water to the weight of solids in the sample (ASTM D-2216)
 ATV: All-terrain vehicle
 RQD: Rock Quality Designation, sum of core pieces 4" in length or greater, divided by the recovered core length

Soil Particle Sizes and Graphic Symbols

	Gravel: Coarse = 3/4" to 3" Fine = 4.76 mm to 3/4"
	Sand: Coarse = 2.0 to 4.76mm Medium = 0.42 to 2.00mm Fine = 0.074 to 0.42mm
	Silt: 0.005 to 0.074mm
	Clay: Finer than 0.005mm

	Sand and Gravel		Miscellaneous Fill
	Silty Sand		Peat and Organics
	Sandy Silt		Organic Silt
	Silty Clay		Sandstone
	Clayey Silt		Shale

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BORING NUMBER: B-1
 PAGE 1 OF 2
 DATE STARTED: 10/20/16
 DATE COMPLETED: 10/20/16

2685 Gilchrist Road ♦ Akron, Ohio 44305 ♦ (330) 733-6748

TEST BORING LOG

PROJECT: Summit Metro Parks Freedom Trail Phase IV
 LOCATION: South Broadway Street, Akron, Ohio
 BORING METHOD: 3 1/4" I.D. Hollow Stem Auger
 SAMPLER USED: 2.0" O.D. Split Spoon
 REMARKS: *Water added to augers during drilling
 WATER ENCOUNTER DEPTH: 30.0' WATER DEPTH ON COMPLETION: *23.0' HOLE DEPTH: 37.0'

PROJECT NUMBER: 161158
 DRILLER: T. Teter
 DRILL USED: CME-75, Truck
 WEATHER: Rain, 60°F
 GROUND ELEVATION: ±987'

DEPTH	SAMPLE		BLOWS/6"	REC	LOG	DESCRIPTION OF MATERIALS & REMARKS
	NO	DEPTH TYPE				
0---		0.7				8" SOD & TOPSOIL.
---			N60=15			
-- 1	2.0	SS	4-5-6-6	21"		Damp, black, MISCELLANEOUS FILL.
---			N60=26			
-- 2	3.5	SS	12-11-8-6	20"		Damp to moist, medium dense, brown & black
5---	5.0					SAND, SILT & SANDSTONE FRAGMENTS. (Fill)
---	6.0		N60=12			
-- 3	7.5	SS	4-6-3-5	11"		Damp, loose, brown SANDSTONE. (Fill)
---	8.5		N60=99			
-- 4	8.5	SS	14-46-28-	24"		Damp, very dense, brown & gray, medium to
10---	10.0		50/4"			coarse SAND, some gravel. (Fill)
---	11.0		N60=15			
-- 5	12.5	SS	9-6-5-3	21"		Damp, medium dense, black, fine to coarse SAND
---	13.5					& CINDERS. (Fill)
-- 6	13.5	SS	4-50/3"	13"		Damp, very dense, gray & black, fine to coarse
15---	15.0					SAND, SLAG & CINDERS. (Fill)

---			N60=24			
-- 7	18.5	SS	15-10-8	1"		Damp, very dense SLAG. (Fill)
20---	20.0					

---			N60=4			
-- 8	23.5	SS	2-1-2	13"		Moist, very loose, brown & black, medium to
25---	25.0					coarse SAND & SILT, minor gravel. (Fill)

---						±27'
---			N60=12			
-- 9	28.5	SS	3-4-5	15"		Wet, loose, brown, fine to medium SAND, some
30---	30.0					silt.

---			N60=16			
-- 10	33.5	SS	5-9-8	18"		Wet, medium dense, brown, fine SAND &
35---	35.0					SILT. Wn=23.3%

---			N60=16			
-- 11	38.5	SS	4-4-8	12"		Wet, medium dense, brown & gray, fine to
40---	40.0					coarse SAND & SANDSTONE FRAGMENTS.

TIMMERMAN GEOTECHNICAL GROUP, INC.

BORING NUMBER: B-1
 PAGE 2 OF 2
 DATE STARTED: 10/20/16
 DATE COMPLETED: 10/20/16

2685 Gilchrist Road ♦ Akron, Ohio 44305 ♦ (330) 733-6748

PROJECT: Summit Metro Parks Freedom Trail Phase IV					PROJECT NUMBER: 161158	
DEPTH	SAMPLE		BLOWS/6"	REC	LOG	DESCRIPTION OF MATERIALS & REMARKS
	NO	DEPTH TYPE				
40---						

---			N60=21			
---	12	43.5	6-9-7	14"		
45---		45.0				Wet, medium dense, brown, fine to coarse SAND & SANDSTONE FRAGMENTS.

---		48.5				48.0'

50---				75"		
---				69%		
---	13		REC:			

---			RQD:	27%		
55---						Gray, fine-grained, well-sorted, well-rounded, clastic, porous, permeable, mildly weathered SANDSTONE with minor diagonal fracturing; the grains become coarse from 57.0'-57.5'
---		57.5				

60---						

65---						

70---						Boring terminated at 57.5 feet.

75---						

80---						

85---						

TIMMERMAN GEOTECHNICAL GROUP, INC.

BORING NUMBER: B-2
PAGE 1 OF 2
DATE STARTED: 10/14/16
DATE COMPLETED: 10/14/16

2685 Gilchrist Road ♦ Akron, Ohio 44305 ♦ (330) 733-6748

TEST BORING LOG

PROJECT: Summit Metro Parks Freedom Trail Phase IV
LOCATION: South Broadway Street, Akron, Ohio
BORING METHOD: 3 1/4" I.D. Hollow Stem Auger
SAMPLER USED: 2.0" O.D. Split Spoon
REMARKS: *Water added to hole during coring
WATER ENCOUNTER DEPTH: 6.0'


PROJECT NUMBER: 161158
DRILLER: N. Rock
DRILL USED: CME-55, Truck
WEATHER: Sunny, 60°F
GROUND ELEVATION: ±966'
WATER DEPTH ON COMPLETION: *5.0' HOLE DEPTH: 32.5'

DEPTH	SAMPLE		BLOWS/6"	REC	LOG	DESCRIPTION OF MATERIALS & REMARKS
	NO	DEPTH TYPE				
0---						
--	1.0		9-31-70-			Crushed LIMESTONE. (Fill)
--	1	SS	100/2"	20"		
--	2.5		N60=7			
--	2	SS	4-3-2	14"		Damp, loose, black, fine to coarse SAND & CINDERS. (Fill)
5---	5.0		N60=5			
--	6.0	SS	2-2-2	8"		Wet, loose, black, medium to coarse SAND & CINDERS. (Fill)
--	7.5		N60=4			
--	8.5	SS	3-2-1	10"		Wet, very loose, black, medium to coarse SAND & CINDERS. (Fill)
10---	10.0		N60=4			
--	11.0		WOH/6"-			±11'
--	5	SS	1-2	18"		Moist, very loose, black PEAT. Wn=26.6%
--	12.5		N60=8			14.1'
--	6	SS	WOH/6"-	16"		Moist to wet, black & gray, fine to coarse SAND & CLAY.
15---	15.0		2-4			
--						±17'
--			N60=9			
--	7	SS	3-3-4	15"		Wet, medium stiff, gray, clayey SILT, some gravel. Wn=61.3% LL=47.8% PI=11.5%
20---	20.0					
--						±22'
--			N60=32			
--	8	SS	9-14-10	12"		Wet, medium dense, brown, fine to coarse SAND & SANDSTONE FRAGMENTS.
25---	25.0					
--						
--						
--	9	SS	4-50/2"	10"		Wet, very dense, brown & gray, fine to coarse SAND & SANDSTONE FRAGMENTS.
30---	30.0					
--						±32'
--						
--	10	SS	50/1"	1"		Wet, compact, gray SANDSTONE.
35---	35.0					
--						
--						
--	11	SS	12-50/1"	5"		Wet, compact, gray SANDSTONE.
40---	40.0					

TIMMERMAN GEOTECHNICAL GROUP, INC.

BORING NUMBER: B-2
 PAGE 2 OF 2
 DATE STARTED: 10/20/16
 DATE COMPLETED: 10/20/16

2685 Gilchrist Road ♦ Akron, Ohio 44305 ♦ (330) 733-6748

PROJECT: Summit Metro Parks Freedom Trail Phase IV				PROJECT NUMBER: 161158		
DEPTH	SAMPLE		BLOWS/6"	REC	LOG	DESCRIPTION OF MATERIALS & REMARKS
	NO	DEPTH TYPE				
40---	40.0			33"		Gray, fine to coarse-grained, poorly-sorted, well-rounded, moderately weathered, clastic, porous SANDSTONE abruptly transitioning at 1.7' to gray, fissile, clastic, severely weathered SHALE.
--			REC:	55%		
--		NX				
--			RQD:	16%		
--						
45---	45.0					
--						
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--						
--						
50---					Boring terminated at 45.0 feet.	
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55---						
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60---						
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65---						
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70---						
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75---						
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80---						
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85---						
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TIMMERMAN GEOTECHNICAL GROUP, INC.

BORING NUMBER: B-3
PAGE 1 OF 2
DATE STARTED: 10/17/16
DATE COMPLETED: 10/17/16

2685 Gilchrist Road ♦ Akron, Ohio 44305 ♦ (330) 733-6748

TEST BORING LOG

PROJECT: Summit Metro Parks Freedom Trail Phase IV
LOCATION: South Broadway Street, Akron, Ohio
BORING METHOD: 3 1/4" I.D. Hollow Stem Auger
SAMPLER USED: 2.0" O.D. Split Spoon
REMARKS: *Water added to hole during coring
WATER ENCOUNTER DEPTH: 8.0' WATER DEPTH ON COMPLETION: *5.0' HOLE DEPTH: 32.7'

PROJECT NUMBER: 161158
DRILLER: J. Thompson
DRILL USED: CME-75, Truck
WEATHER: Cloudy, 60°F
GROUND ELEVATION: ±965'

DEPTH	SAMPLE		BLOWS/6"	REC	LOG	DESCRIPTION OF MATERIALS & REMARKS
	NO	DEPTH TYPE				
0---						
--	1.0		11-33-50-			Damp, very dense, brown & black, fine to coarse SAND & CINDERS. (Fill)
--	2.5	SS	50/4"	22"		
--	3.5		N60=12			
--	5.0	SS	7-6-3	18"		Damp, loose, black CINDERS. (Fill)
5---	6.0		N60=9			
--	7.5	SS	2-3-4	14"		Damp, loose, black CINDERS. (Fill)
--	8.5	SS	1-4-3	6"		Wet, loose, black CINDERS. (Fill)
10---	10.0					
--	11.0		N60=7			±11'
--	12.5	SS	1-1-4	16"		Moist, loose, black PEAT. Wn=156.5%
--	13.5		N60=15			±13'
--	15.0	SS	4-6-5	12"		Wet, medium dense, gray, fine to coarse SAND & GRAVEL.
15---						
--	18.5	SS	N60=8 2-2-4	12"		Saturated, loose, brown, fine to coarse SAND.
20---	20.0					
--	23.5	SS	N60=9 3-3-4	16"		Wet, medium stiff, gray, clayey SILT. Wn=28.3% LL=21.0% PI=5.2%
25---	25.0					±22'
--	28.5	SS	N60=9 5-3-4	13"		Wet, loose, gray, fine to medium SAND & SILT, trace of gravel.
30---	30.0					
--	33.5	SS	50/2"	2"		33' Wet, compact, brown SANDSTONE.
35---	35.0					
--	38.5	SS	50/1"	1"		Wet, compact, brown SANDSTONE.
40---	39.0					

TIMMERMAN GEOTECHNICAL GROUP, INC.

BORING NUMBER: B-3
 PAGE 2 OF 2
 DATE STARTED: 10/20/16
 DATE COMPLETED: 10/20/16

2685 Gilchrist Road ♦ Akron, Ohio 44305 ♦ (330) 733-6748

PROJECT: Summit Metro Parks Freedom Trail Phase IV				PROJECT NUMBER: 161158		
DEPTH	SAMPLE		BLOWS/6"	REC	LOG	DESCRIPTION OF MATERIALS & REMARKS
	NO	DEPTH TYPE				
40---	12	NX				Gray, medium to coarse-grained, well-rounded, poorly sorted, clastic, porous, mildly to moderately weathered SANDSTONE with normal bedding.
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--						
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45---						
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50---						
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55---						
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TIMMERMAN GEOTECHNICAL GROUP, INC.

BORING NUMBER: B-4
 PAGE 1 OF 2
 DATE STARTED: 10/19/16
 DATE COMPLETED: 10/19/16

2685 Gilchrist Road ♦ Akron, Ohio 44305 ♦ (330) 733-6748

TEST BORING LOG

PROJECT: Summit Metro Parks Freedom Trail Phase IV PROJECT NUMBER: 161158
 LOCATION: South Broadway Street, Akron, Ohio DRILLER: J. Thompson
 BORING METHOD: 3 1/4" I.D. Hollow Stem Auger/Roller Bit DRILL USED: CME-75, Truck
 SAMPLER USED: 2.0" O.D. Split Spoon WEATHER: Sunny, 60°F
 REMARKS: *Water added to hole during roller bit drilling GROUND ELEVATION: ±969'
 WATER ENCOUNTER DEPTH: 12.0' WATER DEPTH ON COMPLETION: *8.6' HOLE DEPTH: 25.8'

DEPTH	SAMPLE		BLOWS/6"	REC	LOG	DESCRIPTION OF MATERIALS & REMARKS
	NO	DEPTH TYPE				
0---		0.0				
--	1	2.0	4-25-34- 50/4"	24"		Damp, very dense, MISCELLANEOUS FILL.
--		3.5	N60=13			
--	2	5.0	4-5-5-5	21"		Damp, medium dense, black CINDERS & SLAG. (Fill)
5---		6.0	N60=12			
--	3	7.5	4-4-5-4	21"		Damp, loose, brown & black, fine to coarse SAND & CINDERS. (Fill)
--		8.5	N60=5			
--	4	10.0	1-2-2-2	20"		Damp, loose, black CINDERS. (Fill)
10---		11.0	N60=12			
--	5	12.5	3-4-5-4	12"		Damp, loose, black CINDERS. (Fill)
--		13.5	N60=3			
--	6	15.0	1-12"- 1-1	24"		Wet, very loose to loose, black PEAT. Wn=249.0%
15---						
--						
--			N60=7			
--	7	18.5	2-2-3	13"		Wet, loose, brown & gray, medium to coarse SAND, some silt, trace of gravel.
20---		20.0				
--						
--			N60=31			
--	8	23.5	10-11-12	6"		Wet, medium dense, brown & gray, fine to medium SAND & SANDSTONE.
25---		25.0				
--						
--						
--	9	28.5	4-50/3"	12"		Wet, very dense, gray, fine to coarse SAND & SANDSTONE FRAGMENTS.
30---		30.0				
--						
--						
--	10	33.5	WOH/6"- 4-50/3"	12"		Wet, very dense, gray, fine to medium SAND & SANDSTONE FRAGMENTS.
35---		35.0				
--						
--						
--						
--	11	38.5	50/1"	1"		Wet, compact, brown SANDSTONE.
40---		40.0				

TIMMERMAN GEOTECHNICAL GROUP, INC.

BORING NUMBER: B-4
 PAGE 2 OF 2
 DATE STARTED: 10/20/16
 DATE COMPLETED: 10/20/16

2685 Gilchrist Road ♦ Akron, Ohio 44305 ♦ (330) 733-6748

PROJECT: Summit Metro Parks Freedom Trail Phase IV					PROJECT NUMBER: 161158	
DEPTH	SAMPLE		BLOWS/6"	REC	LOG	DESCRIPTION OF MATERIALS & REMARKS
	NO	DEPTH TYPE				
40---						

-- 12	43.5	SS	50/0"	0"		No Recovery; Probable SANDSTONE.
45---	45.0					

-- 13	48.5	SS	50/2"	2"		Damp, compact, gray SHALE.
50---	50.0					

-- 14	53.5	SS	50/1"	1"		Wet, compact, gray SHALE.
55---	55.0					

-- 15	58.5	SS	50/1"	1"		Wet, compact, gray SHALE.
60---	60.0					

65---						

70---						Boring terminated at 58.6 feet.

75---						

80---						

85---						

TIMMERMAN GEOTECHNICAL GROUP, INC.

BORING NUMBER: B-5
 PAGE 1 OF 1
 DATE STARTED: 10/24/16
 DATE COMPLETED: 10/24/16

2685 Gilchrist Road ♦ Akron, Ohio 44305 ♦ (330) 733-6748

TEST BORING LOG

PROJECT: Summit Metro Parks Freedom Trail Phase IV
 LOCATION: South Broadway Street, Akron, Ohio
 BORING METHOD: 3 1/4" I.D. Hollow Stem Auger
 SAMPLER USED: 2.0" O.D. Split Spoon
 REMARKS: *Water added to hole during coring
 WATER ENCOUNTER DEPTH: 6.0' WATER DEPTH ON COMPLETION: *6.3' HOLE DEPTH: 13.3'

PROJECT NUMBER: 161158
 DRILLER: J. Thompson
 DRILL USED: CME-75, Truck
 WEATHER: Cloudy, 56°F
 GROUND ELEVATION: ±996'

DEPTH	SAMPLE		BLOWS/6"	REC	LOG	DESCRIPTION OF MATERIALS & REMARKS
	NO	DEPTH TYPE				
0---			N60=17			12" ASPHALT.
--	1	1.0				
--		2.0	6-6-7-10	12"		Moist, medium dense, brown SAND.
--			N60=8			±3'
--	2	3.5	2-2-4-6	14"		Moist, loose, brown SILT, minor sand. Wn=21.1%
5---		5.0				
--		6.0	N60=13			Wet, medium dense, gray CLAY, minor sand, trace
--	3	7.5	2-4-6	18"		of gravel. Wn=15.9%
--		8.5	N60=11			
--	4		3-4-4	17"		Moist, medium stiff, gray, clayey SILT, minor
10---		10.0				sand. Wn=17.1% LL=20.6% PI=8.7%
--		11.0				±11'
--	5	12.5	50/2"	0"		No recovery; Probable SANDSTONE.
--		13.5				
15---						
--				74"		
--			REC:	61%		
--	6					Brown, fine-grained, well-rounded, well-sorted,
--			RQD:	56%		clastic, porous, permeable, mildly to
20---						moderately-weathered SANDSTONE with iron
--						staining and a petroleum odor.
--						
--		23.5				
25---						
--						
--						
--						
30---						Boring terminated at 23.5 feet.
--						
--						
35---						
--						
--						
40---						

TIMMERMAN GEOTECHNICAL GROUP, INC.










BORING NUMBER: B-6
 PAGE 1 OF 1
 DATE STARTED: 10/25/16
 DATE COMPLETED: 10/25/16

2685 Gilchrist Road ♦ Akron, Ohio 44305 ♦ (330) 733-6748

TEST BORING LOG

PROJECT: Summit Metro Parks Freedom Trail Phase IV
 LOCATION: South Broadway Street, Akron, Ohio
 BORING METHOD: 3 1/4" I.D. Hollow Stem Auger
 SAMPLER USED: 2.0" O.D. Split Spoon
 REMARKS: *Water added to hole during coring
 WATER ENCOUNTER DEPTH: 13.5' WATER DEPTH ON COMPLETION: *7.0' HOLE DEPTH: 21.0'

PROJECT NUMBER: 161158
 DRILLER: J. Thompson
 DRILL USED: CME-75, Truck
 WEATHER: Sunny, 52°F
 GROUND ELEVATION: ±996'

DEPTH	SAMPLE		BLOWS/6"	REC	LOG	DESCRIPTION OF MATERIALS & REMARKS
	NO	DEPTH TYPE				
0----		0.8	N60=24			9" ASPHALT.
-- 1	1	SS	6-9-9-10	19"		Damp, brown SAND & GRAVEL.
--		2.0				
--		3.5	N60=15			±3'
-- 2	2	SS	5-5-6	17"		Moist, medium dense, brown & gray SILT, minor clay. Wn=18.4%
5----		5.0				
--		6.0	N60=11			Moist to wet, loose, gray CLAY, minor sand, trace of gravel. Wn=17.2%
-- 3	3	SS	2-4-4	14"		
--		7.5	N60=11			
-- 4	4	SS	2-4-4	14"		Moist, medium stiff, gray, silty CLAY, minor sand. Wn=15.7% LL=21.2% PI=9.3%
10----		10.0				11.0'
--		11.0				
-- 5	5	SS	50/3"	3"		Damp, very dense, brown, fine to coarse SAND & SANDSTONE.
--		12.5				
--		13.5				
15----						
--				115"		Red, iron-rich, fine-grained, poorly-sorted, well-rounded, clastic, mildly weathered SANDSTONE; vugs present in bottom 3.7'; clay seams present from 7.8'-8.7' with an abrupt transition to coarse-grained material directly underneath.
-- 6	6	NX	REC:	95%		
--			RQD:	74%		
20----						
--						
--		23.5				
25----						
--						
--						
--						
30----						Boring terminated at 23.5 feet.
--						
--						
--						
35----						
--						
--						
--						
40----						

TIMMERMAN GEOTECHNICAL GROUP, INC.

BORING NUMBER: B-7
 PAGE 1 OF 1
 DATE STARTED: 10/24/16
 DATE COMPLETED: 10/24/16

2685 Gilchrist Road ♦ Akron, Ohio 44305 ♦ (330) 733-6748

TEST BORING LOG

PROJECT: Summit Metro Parks Freedom Trail Phase IV
 LOCATION: South Broadway Street, Akron, Ohio
 BORING METHOD: 3 1/4" I.D. Hollow Stem Auger
 SAMPLER USED: 2.0" O.D. Split Spoon
 REMARKS: *Water added to hole during coring
 WATER ENCOUNTER DEPTH: None WATER DEPTH ON COMPLETION: *13.0' HOLE DEPTH: 15.0'

PROJECT NUMBER: 161158
 DRILLER: J. Thompson
 DRILL USED: CME-75, Truck
 WEATHER: Cloudy, 52°F
 GROUND ELEVATION: ±997'

DEPTH	SAMPLE		BLOWS/6"	REC	LOG	DESCRIPTION OF MATERIALS & REMARKS
	NO	DEPTH TYPE				
0----		0.7	N60=16			8" ASPHALT.
--	1	SS	11-8-4-4	22"		Damp, medium dense, MISCELLANEOUS FILL.
--		2.0				
--		3.5	N60=13			±3'
--	2	SS	5-6-4-5	18"		Moist, stiff, gray, silty CLAY, minor sand.
5----		5.0	N60=55			Wn=17.1% LL=22.0% PI=8.9%
--		6.0	4-12-28-			6.0' Damp, dense, brown & gray, fine to coarse
--	3	SS	50/0"	12"		SAND & SANDSTONE FRAGMENTS.
--		7.5				
--		8.5				
10----						
--				89"		
--			REC:	82%		Brown, fine-grained, well-sorted, well-rounded,
--	4	NX				clastic, permeable, mildly-weathered SANDSTONE
--			RQD:	62%		with a petroleum odor.
15----						
--						
--						
--						
--						
--						
--						
--						
20----		18.5				
--						
--						
--						
--						
25----						
--						
--						
--						
--						
30----						Boring terminated at 18.5 feet.
--						
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35----						
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40----						

TIMMERMAN GEOTECHNICAL GROUP, INC.

LOG NUMBER: B-8
PAGE 1 OF 1
DATE: 10-26-16

2685 Gilchrist Road ♦ Akron, Ohio 44305 ♦ (330) 733-6748

WILDCAT DYNAMIC CONE LOG

PROJECT: Summit Metro Parks Freedom Trail Phase IV
LOCATION: South Broadway, Akron, Ohio
WEATHER: Rain
REMARKS:

PROJECT NUMBER: 161158
GROUND ELEVATION: ±997'
CREW: L.W., J.R, J.A. & D.S.

DEPTH		BLOWS		RESISTANCE KG/CM ²	CONE RESISTANCE				N'	TESTED DENSITY/CONSISTENCY	
FT	M	PER	10 CM		0	50	100	150		NON-COHESIVE	COHESIVE
	0.1		4	17.8	****				5	LOOSE	MEDIUM STIFF
	0.2		19	84.4	*****				24	MEDIUM DENSE	VERY STIFF
1	0.3		16	71.0	*****				20	MEDIUM DENSE	VERY STIFF
	0.4		22	97.7	*****				-	MEDIUM DENSE	VERY STIFF
	0.5		16	71.0	*****				20	MEDIUM DENSE	VERY STIFF
2	0.6		10	44.4	*****				12	MEDIUM DENSE	STIFF
	0.7		22	97.7	*****				-	MEDIUM DENSE	VERY STIFF
	0.8		22	97.7	*****				-	MEDIUM DENSE	VERY STIFF
3	0.9		14	62.2	*****				17	MEDIUM DENSE	VERY STIFF
	1.0		18	79.9	*****				22	MEDIUM DENSE	VERY STIFF
	1.1		21	81.1	*****				23	MEDIUM DENSE	VERY STIFF
4	1.2		30	115.8	*****				-	DENSE	HARD
	1.3		28	108.1	*****				-	DENSE	HARD
	1.4		25	96.5	*****				-	MEDIUM DENSE	VERY STIFF
5	1.5		22	84.9	*****				24	MEDIUM DENSE	VERY STIFF
	1.6		28	108.1	*****				-	DENSE	HARD
	1.7		100	386.0	*****				-	VERY DENSE	HARD

TIMMERMAN GEOTECHNICAL GROUP, INC.

LOG NUMBER: B-9
PAGE 1 OF 1
DATE: 10-26-16

2685 Gilchrist Road ♦ Akron, Ohio 44305 ♦ (330) 733-6748

WILDCAT DYNAMIC CONE LOG

PROJECT: Summit Metro Parks Freedom Trail Phase IV
LOCATION: South Broadway, Akron, Ohio
WEATHER: Rain
REMARKS:

PROJECT NUMBER: 161158
GROUND ELEVATION: ±998'
CREW: L.W., J.R, J.A. & D.S.

DEPTH		BLOWS		RESISTANCE KG/CM ²	CONE RESISTANCE				N'	TESTED DENSITY/CONSISTENCY	
FT	M	PER	10 CM		0	50	100	150		NON-COHESIVE	COHESIVE
	0.1		4	17.8	****				5	LOOSE	MEDIUM STIFF
	0.2		13	57.7	*****				16	MEDIUM DENSE	VERY STIFF
1	0.3		16	71.0	*****				20	MEDIUM DENSE	VERY STIFF
	0.4		20	88.8	*****				25	MEDIUM DENSE	VERY STIFF
	0.5		21	93.2	*****				-	MEDIUM DENSE	VERY STIFF
2	0.6		20	88.8	*****				25	MEDIUM DENSE	VERY STIFF
	0.7		22	97.7	*****				-	MEDIUM DENSE	VERY STIFF
	0.8		19	84.4	*****				24	MEDIUM DENSE	VERY STIFF
3	0.9		16	71.0	*****				20	MEDIUM DENSE	VERY STIFF
	1.0		10	44.4	*****				12	MEDIUM DENSE	STIFF
	1.1		11	42.5	*****				12	MEDIUM DENSE	STIFF
4	1.2		15	57.9	*****				16	MEDIUM DENSE	VERY STIFF
	1.3		33	127.4	*****				-	DENSE	HARD
	1.4		44	169.8	*****				-	DENSE	HARD
5	1.5		39	150.5	*****				-	DENSE	HARD
	1.6		60	231.6	*****				-	VERY DENSE	HARD
	1.7		43	166.0	*****				-	DENSE	HARD
6	1.8	100		386.0	*****				-	VERY DENSE	HARD

TIMMERMAN GEOTECHNICAL GROUP, INC.

LOG NUMBER: B-10
PAGE 1 OF 1
DATE: 10-26-16

2685 Gilchrist Road ♦ Akron, Ohio 44305 ♦ (330) 733-6748

WILDCAT DYNAMIC CONE LOG

PROJECT: Summit Metro Parks Freedom Trail Phase IV
LOCATION: South Broadway, Akron, Ohio
WEATHER: Rain
REMARKS:

PROJECT NUMBER: 161158
GROUND ELEVATION: ±998'
CREW: L.W., J.R, J.A. & D.S.

DEPTH		BLOWS		RESISTANCE KG/CM ²	CONE RESISTANCE				N'	TESTED DENSITY/CONSISTENCY	
FT	M	PER	10 CM		0	50	100	150		NON-COHESIVE	COHESIVE
	0.1		3	13.3	***				3	VERY LOOSE	SOFT
	0.2		10	44.4	*****				12	MEDIUM DENSE	STIFF
1	0.3		14	62.2	*****				17	MEDIUM DENSE	VERY STIFF
	0.4		13	57.7	*****				16	MEDIUM DENSE	VERY STIFF
	0.5		13	57.7	*****				16	MEDIUM DENSE	VERY STIFF
2	0.6		14	62.2	*****				17	MEDIUM DENSE	VERY STIFF
	0.7		13	57.7	*****				16	MEDIUM DENSE	VERY STIFF
	0.8		14	62.2	*****				17	MEDIUM DENSE	VERY STIFF
3	0.9		100	444.0	*****				-	VERY DENSE	HARD

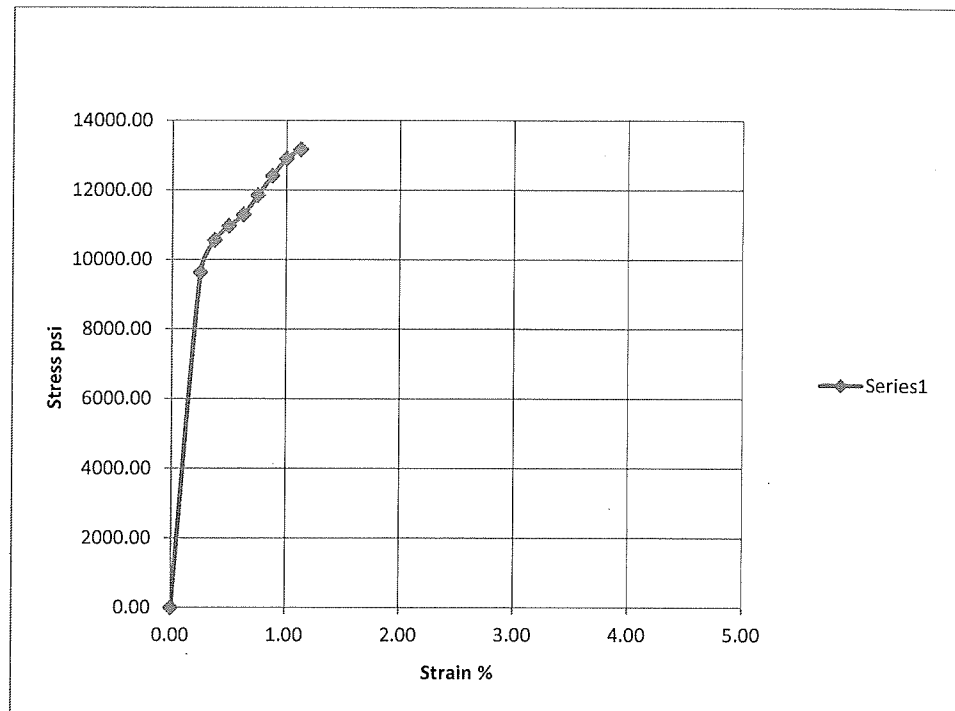
Unconfined Rock Compression Test (ASTM D-2938)

Job Name: Summit Metro Park Freedom Trail Phase 4
Boring Number: B-1
Sample Number: 13
Depth: 50.8'

Project Number: 161158
Date: 11-14-16
Sample Description: Gray Sandstone.
Unconfined Compressive Strength: 13,170 psi
Strain at Failure: 1.13%
Strain at 50% of Maximum Strength: 0.19%
Modulus of Elasticity: 349,000 psi
Average Length: 3.988"
Average Diameter: 1.985"
Height to Diameter Ratio: 2.01:1
Dry Unit Weight: 182.9 pcf

Remarks:

Strain (%)	Stress (psi)
0.00	0.00
0.25	9632.74
0.38	10560.15
0.50	10970.54
0.63	11293.67
0.75	11852.70
0.88	12414.96
1.00	12909.36
1.13	13174.34



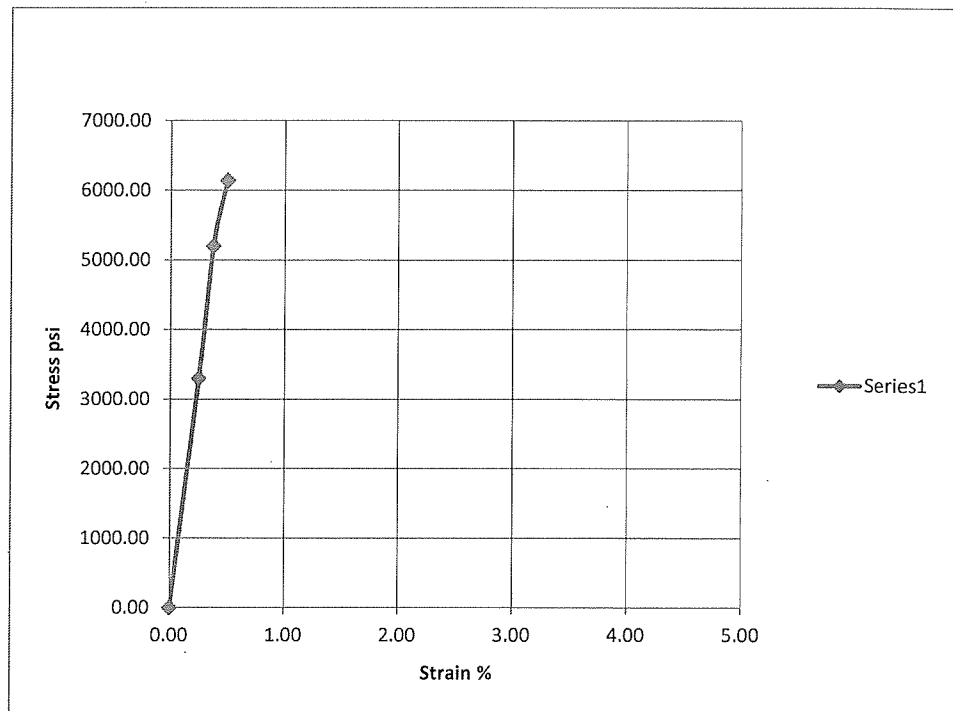
Unconfined Rock Compression Test (ASTM D-2938)

Job Name: Summit Metro Park Freedom Trail Phase 4
Boring Number: B-5
Sample Number: 6
Depth: 13.9'

Project Number: 161158
Date: 11-14-16
Sample Description: Brown Sandstone.
Unconfined Compressive Strength: 6,140 psi
Strain at Failure: 0.50%
Strain at 50% of Maximum Strength: 0.23%
Modulus of Elasticity: 1,137,000 psi
Average Length: 3.988"
Average Diameter: 1.985"
Height to Diameter Ratio: 2.01:1
Dry Unit Weight: 153.9 pcf

Remarks:

Strain (%)	Stress (psi)
0.00	0.00
0.25	3299.24
0.38	5202.52
0.50	6142.85



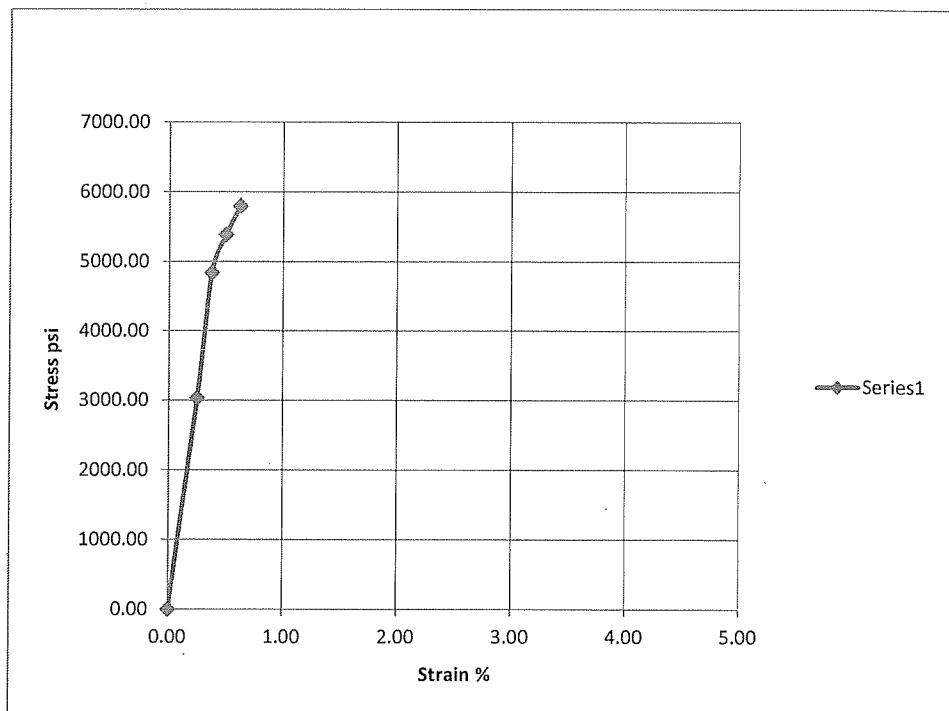
Unconfined Rock Compression Test (ASTM D-2938)

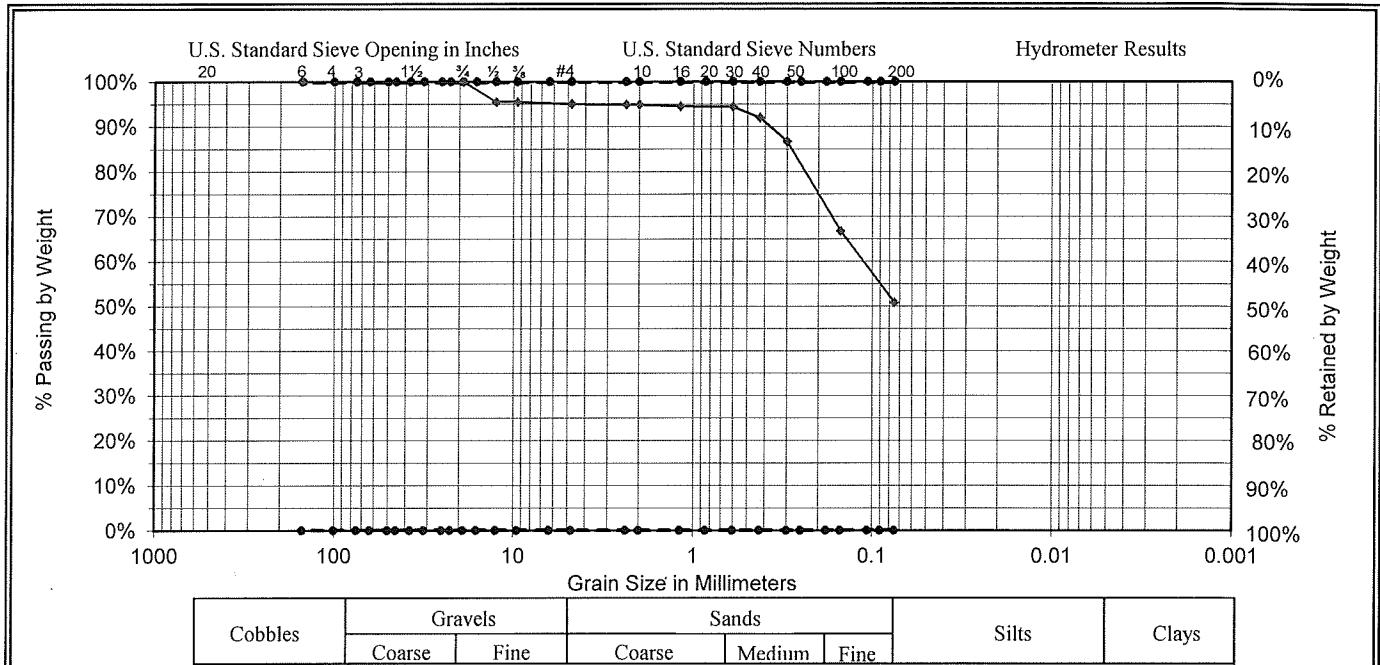
Job Name: Summit Metro Park Freedom Trail Phase 4
Boring Number: B-6
Sample Number: 6
Depth: 18.8'

Project Number: 161158
Date: 11-14-16
Sample Description: Red Sandstone.
Unconfined Compressive Strength: 5,800 psi
Strain at Failure: 0.63%
Strain at 50% of Maximum Strength: 0.23%
Modulus of Elasticity: 252,000 psi
Average Length: 4.000"
Average Diameter: 1.985"
Height to Diameter Ratio: 2.02:1
Dry Unit Weight: 161.7 pcf

Remarks:

Strain (%)	Stress (psi)
0.00	0.00
0.25	3031.03
0.38	4840.61
0.50	5389.94
0.63	5797.10





Date : 11/09/16
 Project#: 161158
 Sample ID: 16235
 Source: TGG Drilling
 Project: Summit Metro Parks Freedom Trail Phase IV
 Location: Akron, Ohio
 Boring #: B-1:S-10
 Depth: 33.5'-35.0'

% Gravel 4.9%
 % Sand 44.2%
 % Silt & Clay 50.9%

Coarse Section		Actual Cumulative	Interpolated Cumulative	Specs		Fines Section		Actual Cumulative	Interpolated Cumulative	Specs	
Sieve Size	Metric	Percent Passing	Percent Passing	Max	Min	Sieve Size	Metric	Percent Passing	Percent Passing	Max	Min
6.00"	150.00		100.0%			#4	4.750	95.1%	95.1%		
4.00"	100.00		100.0%			#8	2.360	94.9%	94.9%		
3.00"	75.00		100.0%			#10	2.000	94.9%	94.9%		
2.50"	63.00		100.0%			#16	1.180	94.5%	94.5%		
2.00"	50.00		100.0%			#20	0.850	94.5%	94.5%		
1.75"	45.00		100.0%			#30	0.600	94.4%	94.4%		
1.50"	37.50		100.0%			#40	0.425	92.0%	92.0%		
1.25"	31.50		100.0%			#50	0.300	86.7%	86.7%		
1.00"	25.00		100.0%			#60	0.250	80.1%	80.1%		
7/8"	22.40		100.0%			#80	0.180	70.8%	70.8%		
3/4"	19.00	100.0%	100.0%			#100	0.150	66.8%	66.8%		
5/8"	16.00		97.9%			#140	0.106	57.5%	57.5%		
1/2"	12.50	95.5%	95.5%			#170	0.090	54.1%	54.1%		
3/8"	9.50	95.5%	95.5%			#200	0.075	50.9%	50.9%		
1/4"	6.30		95.2%			#270	0.053				
#4	4.75	95.1%	95.1%								

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Construction Quality Control
Materials Testing Laboratory

Atterberg Limits

Date Received: 11/9/16

Project #: 161158

Sample ID: 16235

Source: TGG Drilling

ASTM D-2487, Unified Soils Classification System

ML-MH

Liquid Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	22.00	26.08	28.12			
Weight of Dry Soils + Pan:	18.20	23.09	24.66			
Weight of Pan:	10.66	16.85	17.15			
Weight of Dry Soils:	7.54	6.24	7.51			
Weight of Moisture:	3.80	2.99	3.46			
% Moisture:	50.4 %	47.9 %	46.1 %			
N:	18	23	31			

Liquid Limit @ 25 Blows: 47.8 %

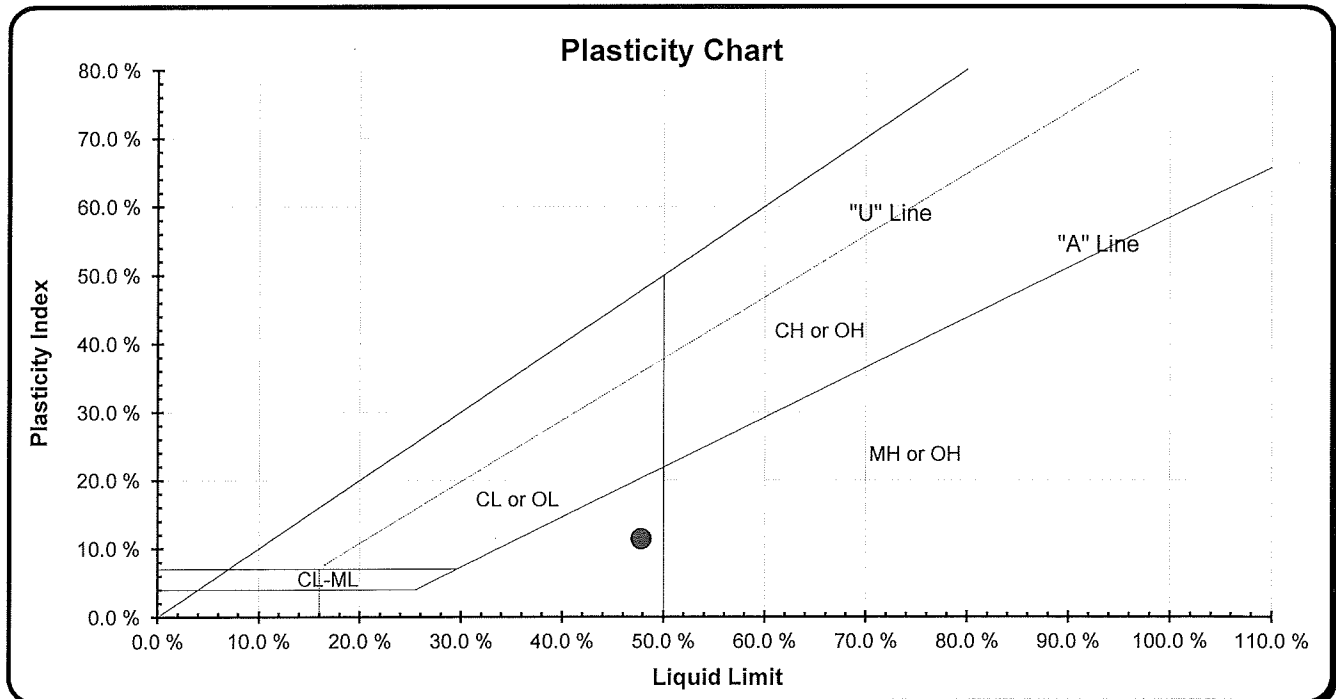
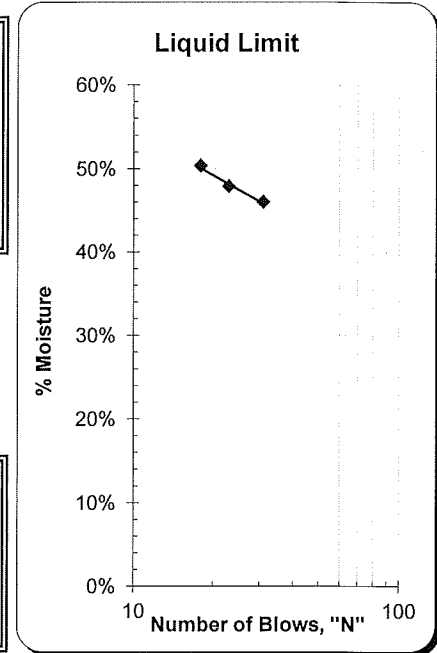
Plastic Limit: 36.3 %

Plasticity Index, I_p: 11.5 %

Natural Moisture Content: 61.3 %

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	21.53					
Weight of Dry Soils + Pan:	19.42					
Weight of Pan:	13.61					
Weight of Dry Soils:	5.81					
Weight of Moisture:	2.11					
% Moisture:	36.3 %					



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Atterberg Limits

Date Received: 11/9/16

Project #: 161158

Sample ID: 16235

Source: TGG Drilling

ASTM D-2487, Unified Soils Classification System

CL-ML

Liquid Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	23.09	27.04	31.97			
Weight of Dry Soils + Pan:	20.88	24.25	29.45			
Weight of Pan:	10.62	10.81	17.15			
Weight of Dry Soils:	10.26	13.44	12.30			
Weight of Moisture:	2.21	2.79	2.52			
% Moisture:	21.5 %	20.8 %	20.5 %			
N:	18	27	32			

Liquid Limit @ 25 Blows: 21.0 %

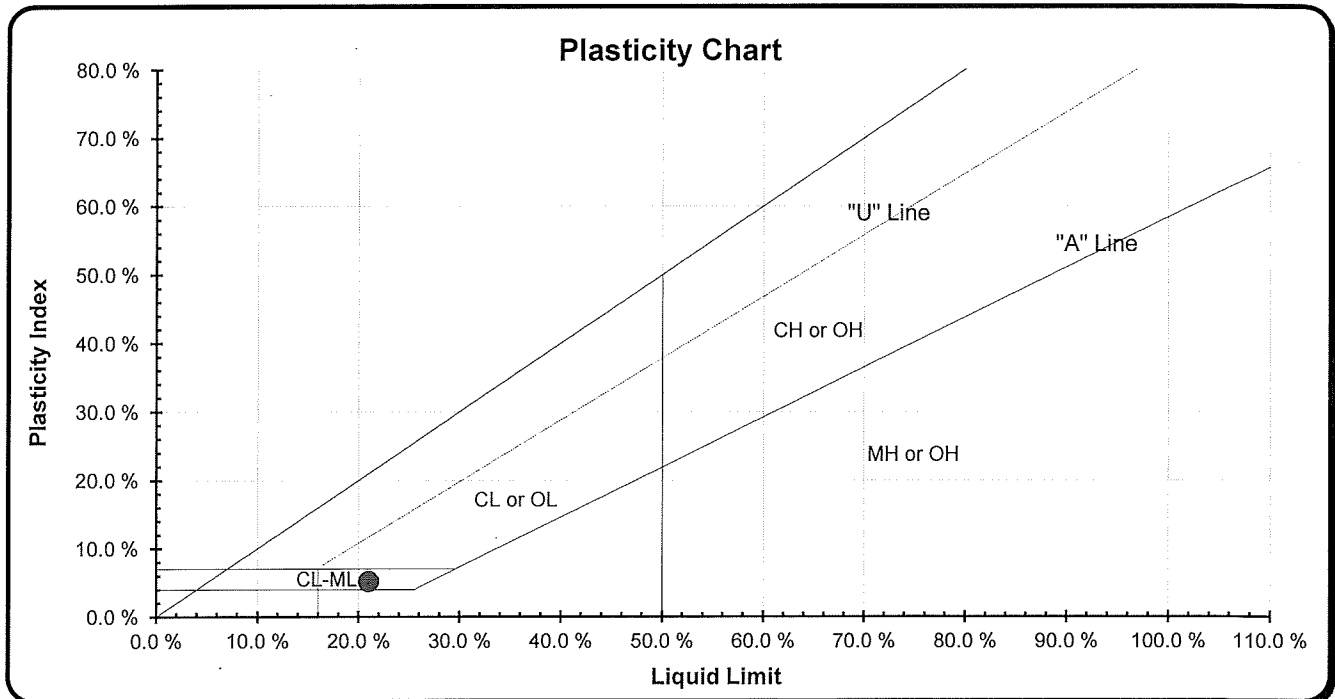
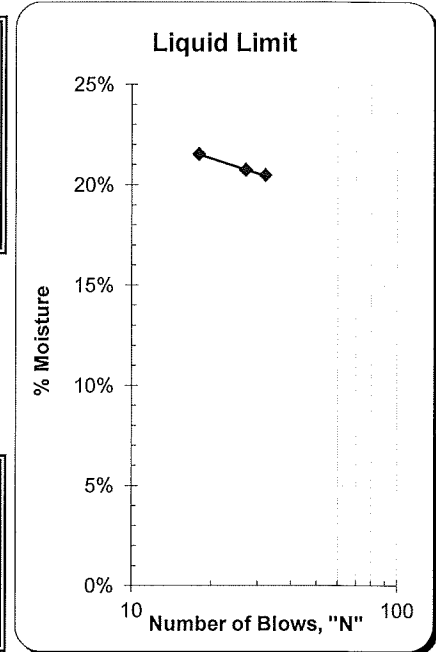
Plastic Limit: 15.8 %

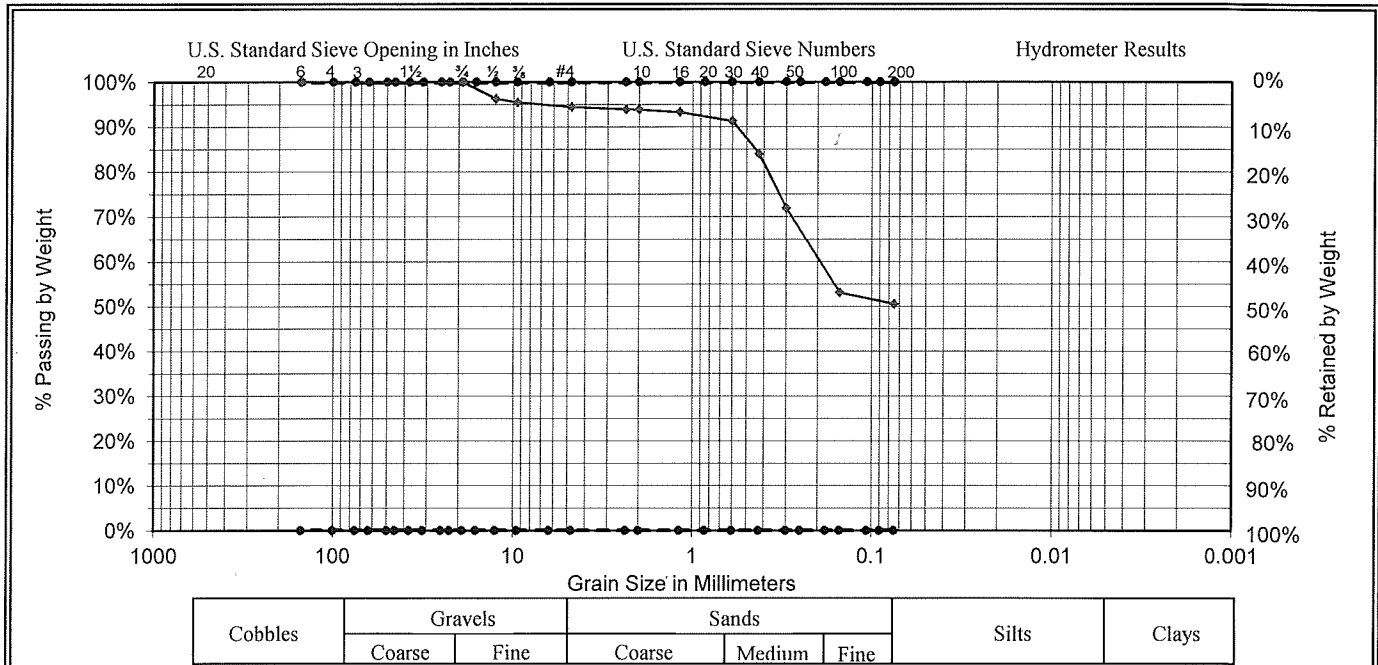
Plasticity Index, I_p : 5.2 %

Natural Moisture Content: 28.3 %

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	25.77					
Weight of Dry Soils + Pan:	24.13					
Weight of Pan:	13.72					
Weight of Dry Soils:	10.41					
Weight of Moisture:	1.64					
% Moisture:	15.8 %					





Date: 11/09/16
 Project#: 161158
 Sample ID: 16235
 Source: TGG Drilling
 Project: Summit Metro Parks Freedom Trail Phase IV
 Location: Akron, Ohio
 Boring #: B-3:S-9
 Depth: 28.5'-30.0'

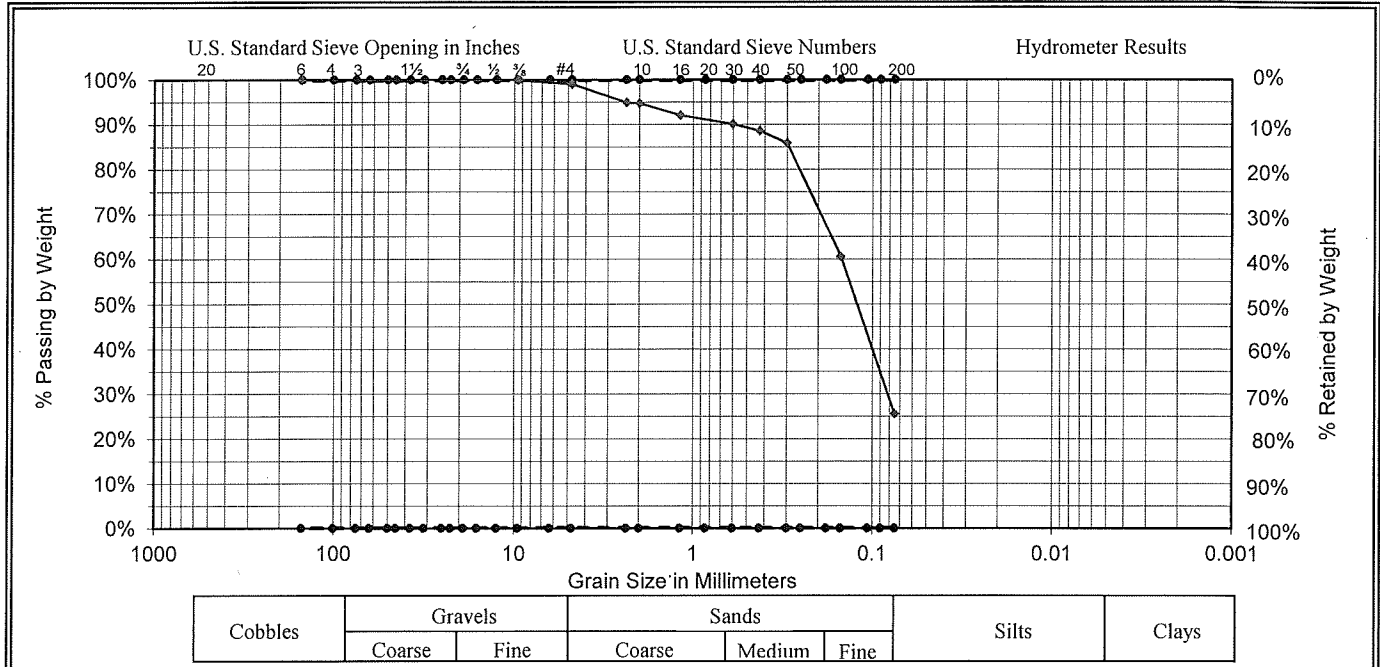
% Gravel 5.5%
 % Sand 43.9%
 % Silt & Clay 50.6%

Coarse Section		Actual Cumulative	Interpolated Cumulative	Specs		Fines Section		Actual Cumulative	Interpolated Cumulative	Specs	
Sieve Size	Metric	Percent Passing	Percent Passing	Max	Min	Sieve Size	Metric	Percent Passing	Percent Passing	Max	Min
6.00"	150.00		100.0%			#4	4.750	94.5%	94.5%		
4.00"	100.00		100.0%			#8	2.360	94.0%	94.0%		
3.00"	75.00		100.0%			#10	2.000	93.9%	93.9%		
2.50"	63.00		100.0%			#16	1.180	93.3%	93.3%		
2.00"	50.00		100.0%			#20	0.850	91.3%	92.2%		
1.75"	45.00		100.0%			#30	0.600	91.3%	91.3%		
1.50"	37.50		100.0%			#40	0.425	84.0%	84.0%		
1.25"	31.50		100.0%			#50	0.300	72.0%	72.0%		
1.00"	25.00		100.0%			#60	0.250		65.7%		
7/8"	22.40		100.0%			#80	0.180		56.9%		
3/4"	19.00	100.0%	100.0%			#100	0.150	53.2%	53.2%		
5/8"	16.00		98.3%			#140	0.106		51.7%		
1/2"	12.50	96.3%	96.3%			#170	0.090		51.1%		
3/8"	9.50	95.5%	95.5%			#200	0.075	50.6%	50.6%		
1/4"	6.30		94.8%			#270	0.053				
#4	4.75	94.5%	94.5%								

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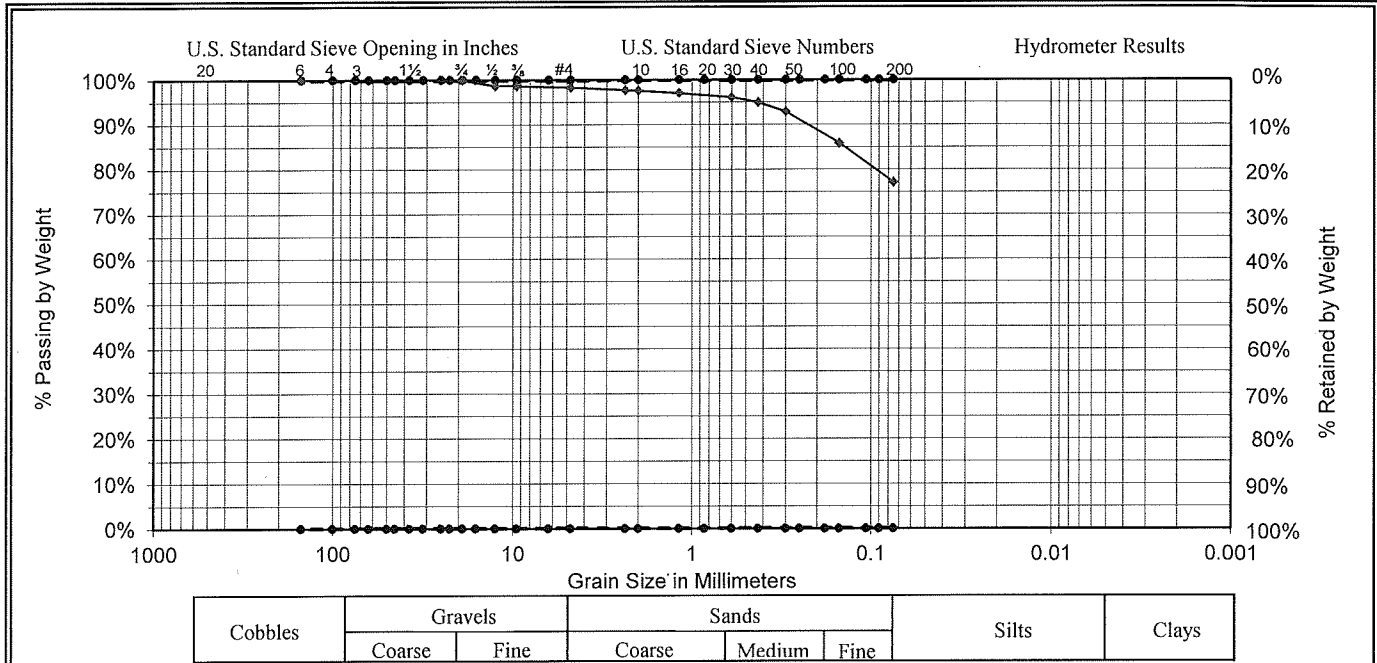
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Atterberg Limits

Date Received: 11/9/16

Project #: 161158

Sample ID: 16235

Source: TGG Drilling

ASTM D-2487, Unified Soils Classification System

CL

Liquid Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	33.98	35.34	33.59			
Weight of Dry Soils + Pan:	31.03	32.29	30.73			
Weight of Pan:	16.94	17.35	16.68			
Weight of Dry Soils:	14.09	14.94	14.05			
Weight of Moisture:	2.95	3.05	2.86			
% Moisture:	20.9 %	20.4 %	20.4 %			
N:	20	26	32			

Liquid Limit @ 25 Blows: 20.6 %

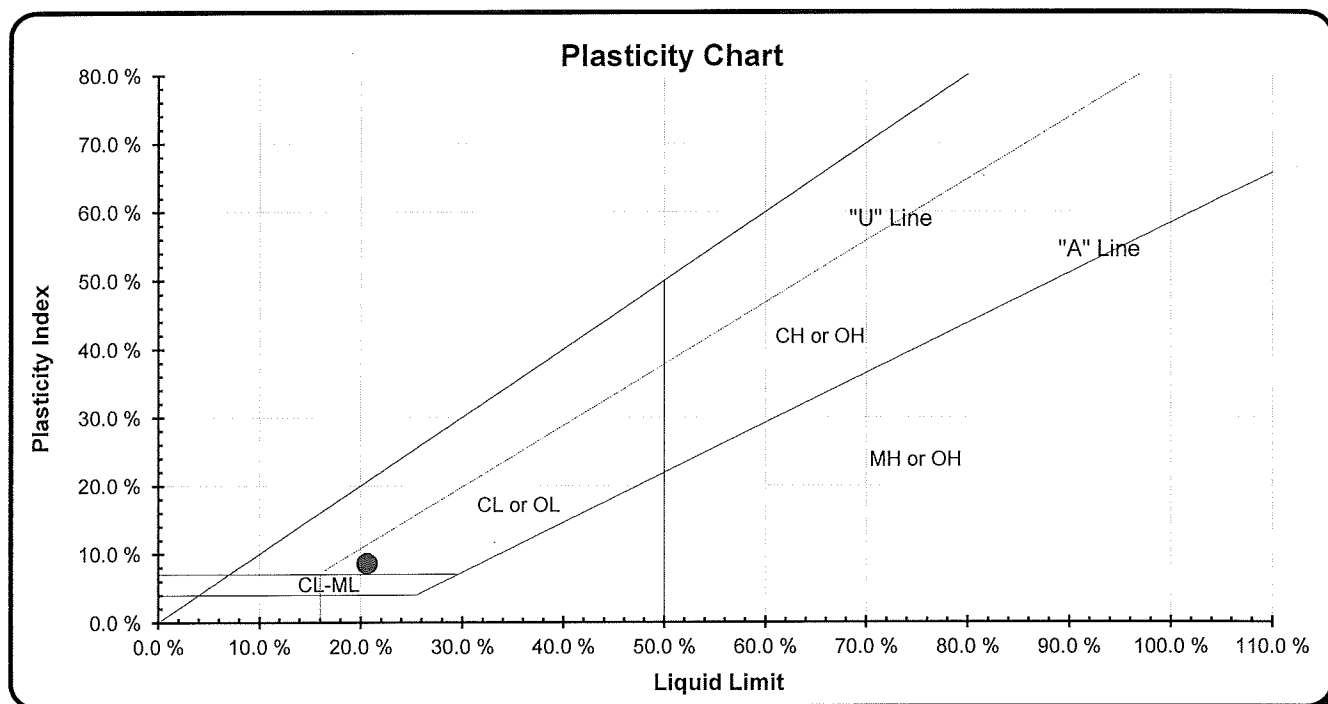
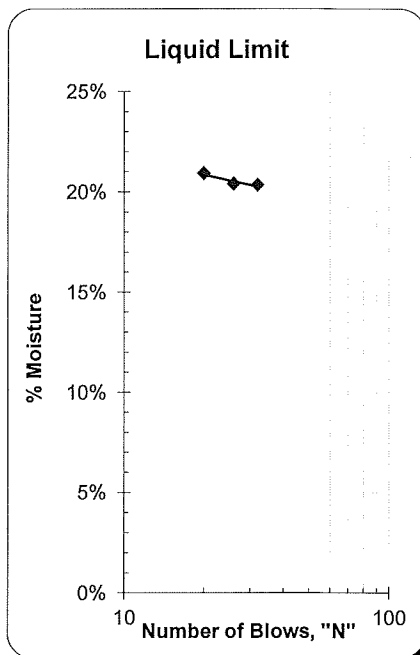
Plastic Limit: 12.0 %

Plasticity Index, I_p: 8.7 %

Natural Moisture Content: 17.1 %

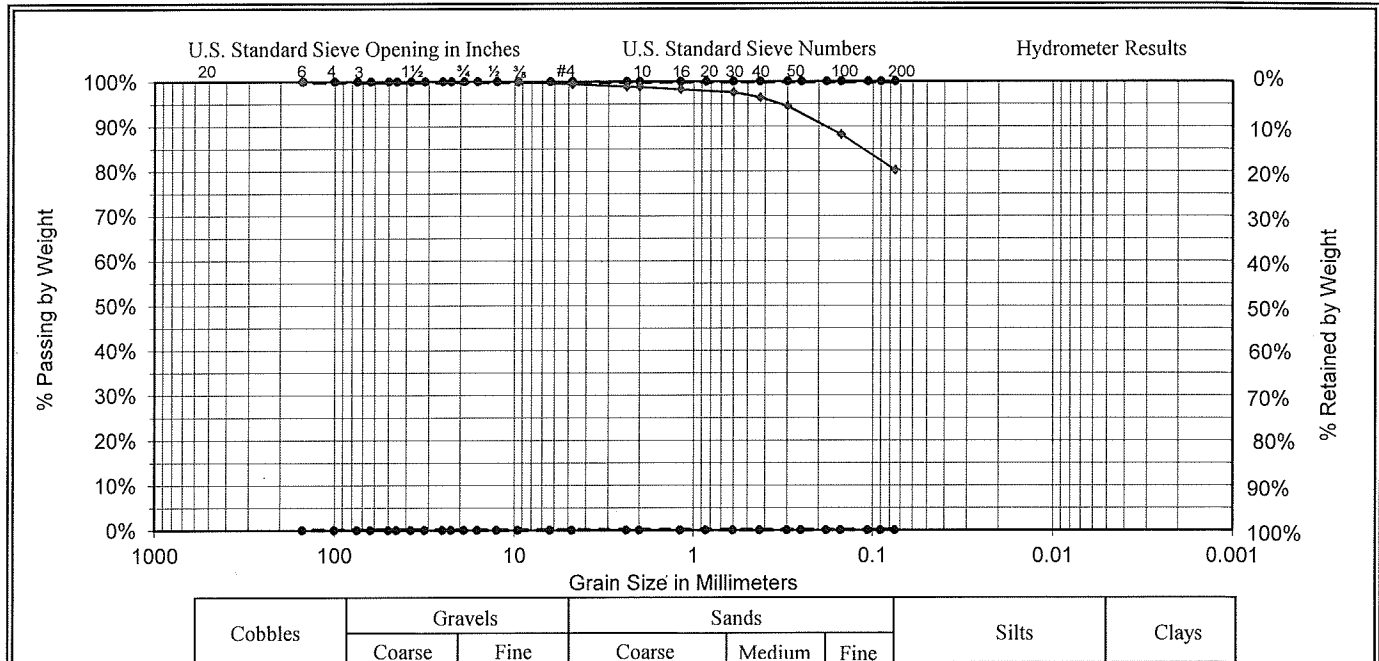
Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	27.63					
Weight of Dry Soils + Pan:	26.13					
Weight of Pan:	13.59					
Weight of Dry Soils:	12.54					
Weight of Moisture:	1.50					
% Moisture:	12.0 %					



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Cobbles	Gravels		Sands			Silts	Clays
	Coarse	Fine	Coarse	Medium	Fine		

Date: 11/09/16
 Project#: 161158
 Sample ID: 16235
 Source: TGG Drilling
 Project: Summit Metro Parks Freedom Trail Phase IV
 Location: Akron, Ohio
 Boring #: B-6:S-2
 Depth: 6.0'-7.5'

% Gravel % Sand
 0.5% 19.2%
 % Silt & Clay
 80.3%

Coarse Section		Actual Cumulative	Interpolated Cumulative	Specs		Fines Section		Actual Cumulative	Interpolated Cumulative	Specs	
Sieve Size	Metric	Percent Passing	Percent Passing	Max	Min	Sieve Size	Metric	Percent Passing	Percent Passing	Max	Min
6.00"	150.00		100.0%			#4	4.750	99.5%	99.5%		
4.00"	100.00		100.0%			#8	2.360	98.9%	98.9%		
3.00"	75.00		100.0%			#10	2.000	98.9%	98.9%		
2.50"	63.00		100.0%			#16	1.180	98.3%	98.3%		
2.00"	50.00		100.0%			#20	0.850	97.9%	97.9%		
1.75"	45.00		100.0%			#30	0.600	97.6%	97.6%		
1.50"	37.50		100.0%			#40	0.425	96.5%	96.5%		
1.25"	31.50		100.0%			#50	0.300	94.6%	94.6%		
1.00"	25.00		100.0%			#60	0.250		92.4%		
7/8"	22.40		100.0%			#80	0.180		89.5%		
3/4"	19.00		100.0%			#100	0.150	88.2%	88.2%		
5/8"	16.00		100.0%			#140	0.106		83.6%		
1/2"	12.50		100.0%			#170	0.090		81.9%		
3/8"	9.50	100.0%	100.0%			#200	0.075	80.3%	80.3%		
1/4"	6.30		99.6%			#270	0.053				
#4	4.75	99.5%	99.5%								

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Atterberg Limits

Date Received: 11/9/16 **Project:** Summit Metro Parks Freedom Trail Phase IV
Project #: 161158 **Location:** Akron, Ohio
Sample ID: 16235 **Boring #:** B-6:S-3
Source: TGG Drilling **Depth:** 8.5'-10.0'
 ASTM D-2487, Unified Soils Classification System
 CL

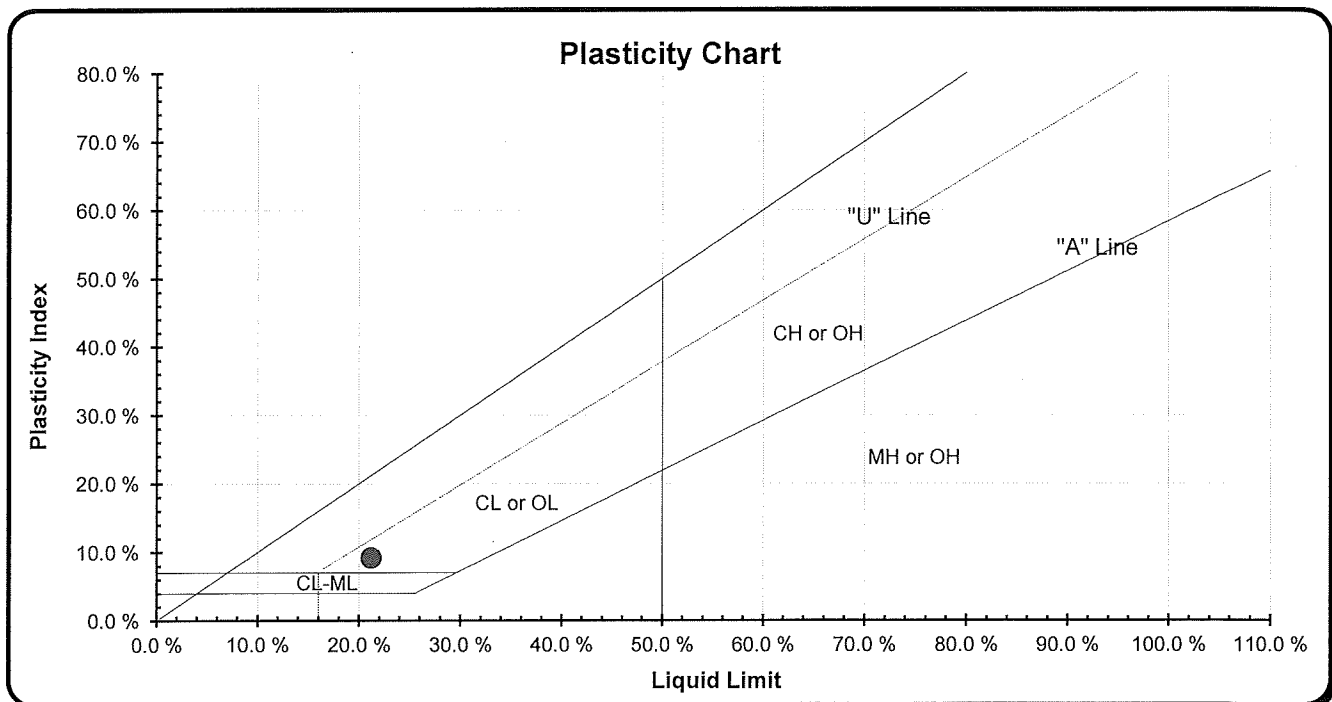
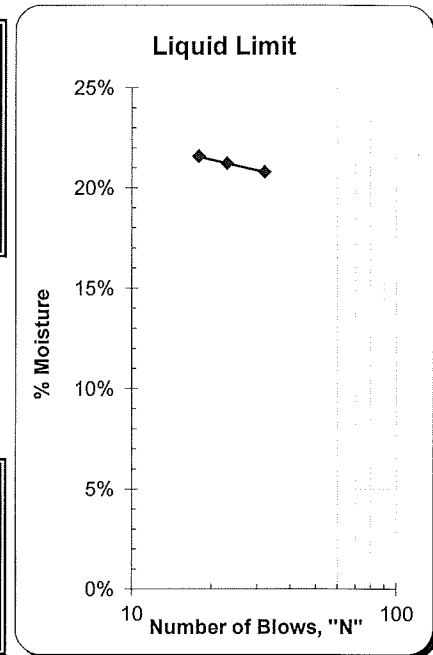
Liquid Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	28.15	33.12	28.56			
Weight of Dry Soils + Pan:	25.05	30.29	25.43			
Weight of Pan:	10.70	16.97	10.39			
Weight of Dry Soils:	14.35	13.32	15.04			
Weight of Moisture:	3.10	2.83	3.13			
% Moisture:	21.6 %	21.3 %	20.8 %			
N:	18	23	32			

Liquid Limit @ 25 Blows: 21.2 %
Plastic Limit: 11.9 %
Plasticity Index, I_p: 9.3 %
Natural Moisture Content: 15.7 %

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	25.53					
Weight of Dry Soils + Pan:	24.27					
Weight of Pan:	13.68					
Weight of Dry Soils:	10.59					
Weight of Moisture:	1.26					
% Moisture:	11.9 %					



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Atterberg Limits

Date Received: 11/9/16

Project #: 161158

Sample ID: 16235

Source: TGG Drilling

ASTM D-2487, Unified Soils Classification System

CL

Liquid Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	35.97	34.99	25.25			
Weight of Dry Soils + Pan:	32.44	31.78	22.71			
Weight of Pan:	17.12	16.91	10.77			
Weight of Dry Soils:	15.32	14.87	11.94			
Weight of Moisture:	3.53	3.21	2.54			
% Moisture:	23.0 %	21.6 %	21.3 %			
N:	18	26	32			

Liquid Limit @ 25 Blows: 22.0 %

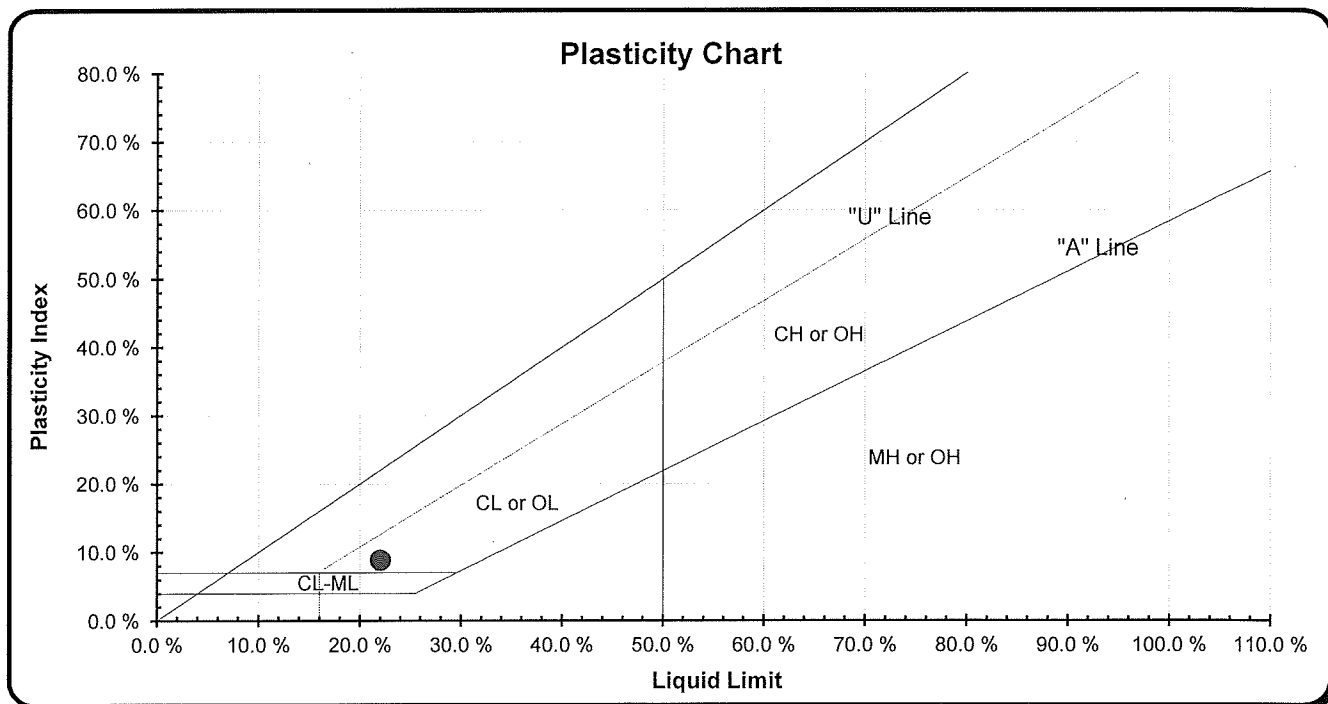
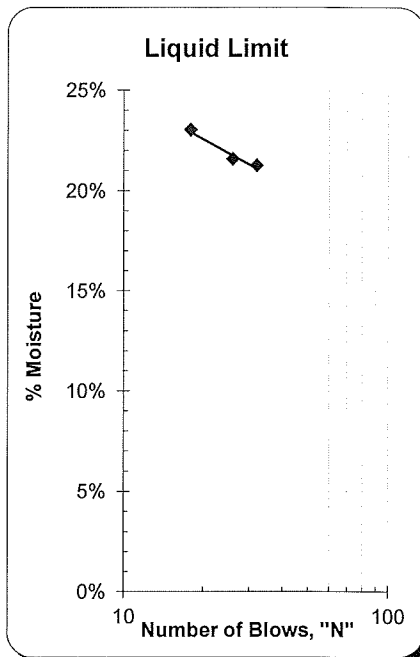
Plastic Limit: 13.1 %

Plasticity Index, I_p : 8.9 %

Natural Moisture Content: 17.1 %

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	27.32					
Weight of Dry Soils + Pan:	25.73					
Weight of Pan:	13.60					
Weight of Dry Soils:	12.13					
Weight of Moisture:	1.59					
% Moisture:	13.1 %					



Appendix B

Construction and Design Cost Estimates

FREEDOM TRAIL PHASE IV
BRIDGE NO. 1
CONSTRUCTION AND ENGINEERING COST ESTIMATE
REVISED 5/17/2017

FREEDOM TRAIL PHASE IV

STRUCTURE 1

ALT 1: Pre-Fabricated Steel Bridge (105' Span) & Slab Bridge (45' Span) with MSE Wall

Calculated By: WER 12/20/2016
 Checked By: JDH 1/16/2017
 Bridge Length = 150 ft
 MSE Wall Length = 497 ft
 Total Length = 647 ft

ITEM	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
452	8" NON-REINFORCED CONCRETE PAVEMENT, CLASS QC1	492	SY	\$60	\$29,520
503	COFFERDAMS AND EXCAVATION BRACING	1	LUMP	\$5,000	\$5,000
503	UNCLASSIFIED EXCAVATION	132	CY	\$40	\$5,280
505	PILE DRIVING EQUIPMENT MOBILIZATION	1	LUMP	\$10,000	\$10,000
507	STEEL PILES HP10X42, FURNISHED	1130	FT	\$25	\$28,250
507	STEEL PILES HP10X42, DRIVEN	1010	FT	\$16	\$16,160
509	EPOXY COATED REINFORCING STEEL	25,900	POUND	\$1.10	\$28,490
511	CLASS QC1 CONCRETE, ABUTMENT INCLUDING FOOTING	107	CY	\$450	\$48,150
511	CLASS QC2 CONCRETE, SUPERSTRUCTURE (SLAB BRIDGE)	33	CY	\$750	\$24,750
511	CLASS QC2 CONCRETE, BRIDGE DECK	25	CY	\$600	\$15,000
511	CLASS QC2 CONCRETE, BRIDGE DECK (PARAPET) (ON MSE WALL)	43	CY	\$550	\$23,650
514	MAINTAINING TRAFFIC, MISC: FOR CONSTRUCTION OF ABUTMENTS	1	LUMP	\$20000	\$20,000
530	SPECIAL - SEALING, MISC.: ARCHITECTURAL STAINING	9219	SF	\$6	\$55,314
516	ELASTOMERIC BEARING WITH INTERNAL LAMINATES ONLY (NEOPRENE)	4	EACH	\$900	\$3,600
530	SPECIAL - STRUCTURE, MISC.: PRE-ENGINEERED PEDESTRIAN BRIDGE	1	LUMP	\$144,900	\$144,900
530	SPECIAL - FORMLINER (PARAPET AND ABUTMENTS)	2878	SF	\$12	\$34,536
530	SPECIAL - RAMMED AGGREGATE PIERS UNDER MSE WALL FILL	4800	FT	\$70	\$336,000
607	FENCE	454	FT	\$120	\$54,480
690	SPECIAL - WORK INVOLVING HAZARDOUS WASTE	1	LUMP	\$46,150	\$46,150
840	MECHANICALLY STABILIZED EARTH WALL (INCL. EXC., COPING, SGB, ETC.)	8600	SF	\$75	\$645,000
840	MECHANICALLY STABILIZED EARTH WALL (FORMLINER ONLY)	8600	SF	\$0.50	\$4,300

INCIDENTALS INCLUDE:

SEALING OF CONCRETE SURFACES
 PEJF
 EXPANSION JOINTS

SUBTOTAL = \$1,578,530
 INCIDENTALS = 15%
 SUB-TOTAL COST = \$1,815,310
 CONTINGENCY = 20%
 SUB-TOTAL COST = \$2,178,371

CONTINGENCIES INCLUDE:

POTENTIAL RELOCATION OR PROTECTION OF GAS LINE AT FWD ABUTMENT
 POTENTIAL RELOCATION OR PROTECTION OF AT&T FIBER OPTIC LINE AT FWD ABUTMENT
 ESTIMATED COSTS DUE TO ACTUAL ENGINEERING

INFLATION CONTINGENCY = 10%
 TOTAL CONSTRUCTION COST = \$2,396,209
 Cost per Trail Foot = \$3,704
 FINAL DESIGN COST (11% of Total) = \$263,583
 TOTAL COST WITH CONSTRUCTION AND FINAL DESIGN = \$2,659,792

**FREEDOM TRAIL PHASE IV
STRUCTURE 1**

Calculated By: WER 12/20/2016
Checked By: JDH 1/16/2017

ALT 2: Pre-Fabricated Steel Bridge (125' Span) with MSE Wall

Bridge Length = 125 ft
MSE Wall Length = 360 ft (includes 'wrap around' length)
Total Length = 485 ft

ITEM	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
452	8" NON-REINFORCED CONCRETE PAVEMENT, CLASS QC1	528	SY	\$60	\$31,680
503	COFFERDAMS AND EXCAVATION BRACING	1	LUMP	\$10,000	\$10,000
503	UNCLASSIFIED EXCAVATION	96	CY	\$40	\$3,840
505	PILE DRIVING EQUIPMENT MOBILIZATION	1	LUMP	\$10,000	\$10,000
507	STEEL PILES HP10X42, FURNISHED	700	FT	\$25	\$17,500
507	STEEL PILES HP10X42, DRIVEN	625	FT	\$16	\$10,000
509	EPOXY COATED REINFORCING STEEL	22,525	POUND	\$1.10	\$24,778
511	CLASS QC1 CONCRETE, ABUTMENT INCLUDING FOOTING	66	CY	\$500	\$33,000
511	CLASS QC2 CONCRETE, BRIDGE DECK	32	CY	\$600	\$19,200
511	CLASS QC2 CONCRETE, BRIDGE DECK (PARAPET) (ON MSE WALL)	45	CY	\$550	\$24,750
514	MAINTAINING TRAFFIC, MISC: FOR CONSTRUCTION OF ABUTMENTS	1	LUMP	\$20000	\$20,000
530	SPECIAL - SEALING, MISC.: ARCHITECTURAL STAINING OF MSE AND RAILING	7136	SF	\$6	\$42,813
530	SPECIAL - STRUCTURE, MISC.: PRE-ENGINEERED PEDESTRIAN BRIDGE	1	LUMP	\$172,500	\$172,500
530	SPECIAL - PARAPET FORMLINER	2845	SF	\$12	\$34,140
530	SPECIAL - RAMMED AGGREGATE PIERS UNDER MSE WALL FILL	4800	FT	\$70	\$336,000
607	FENCE	381	FT	\$120	\$45,720
690	SPECIAL - WORK INVOLVING HAZARDOUS WASTE	1	LUMP	\$46,150	\$46,150
840	MECHANICALLY STABILIZED EARTH WALL (INCL. EXC., COPING, SGB, ETC.)	5900	SF	\$75	\$442,500
840	MECHANICALLY STABILIZED EARTH WALL (FORMLINER ONLY)	5900	SF	\$0.50	\$2,950

INCIDENTALS INCLUDE:

SEALING OF CONCRETE SURFACES
PEJF
EXPANSION JOINTS

SUBTOTAL = \$1,327,521
INCIDENTALS = 15%
SUB-TOTAL COST = \$1,526,649
CONTINGENCY = 20%
SUB-TOTAL COST = \$1,831,979

CONTINGENCIES INCLUDE:

POTENTIAL RELOCATION OR PROTECTION OF GAS LINE AT FWD ABUTMENT
POTENTIAL RELOCATION OR PROTECTION OF AT&T FIBER OPTIC LINE AT FWD ABUTMENT
ESTIMATED COSTS DUE TO ACTUAL ENGINEERING

INFLATION CONTINGENCY = 10%
TOTAL CONSTRUCTION COST = \$2,015,176
Cost per Trail Foot = \$4,155
FINAL DESIGN COST (11% of Total) = \$221,669

TOTAL COST WITH CONSTRUCTION AND FINAL DESIGN = \$2,236,845

**FREEDOM TRAIL PHASE IV
STRUCTURE 1**

Calculated By: JDH 1/16/2017
Checked By: WER 1/16/2017

ALT 3: Pre-Fabricated Steel Bridge (125' Span) with Approach Bridge Ramp

This alternate is recommended

Main Span Bridge Length = 125 ft
West Approach Ramp Bridge Length = 322 ft
Total Length = 447 ft

ITEM	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
503	COFFERDAMS AND EXCAVATION BRACING	1	LUMP	\$10,000	\$10,000
503	UNCLASSIFIED EXCAVATION	320	CY	\$40	\$12,800
505	PILE DRIVING EQUIPMENT MOBILIZATION	1	LUMP	\$10,000	\$10,000
507	STEEL PILES HP10X42, FURNISHED	2690	FT	\$25	\$67,250
507	STEEL PILES HP10X42, DRIVEN	2360	FT	\$16	\$37,760
509	EPOXY COATED REINFORCING STEEL	118,800	POUND	\$1.10	\$130,680
511	CLASS QC1 CONCRETE, ABUTMENT INCLUDING FOOTING (EAST ABUT MAIN SPAN)	46	CY	\$500	\$23,000
511	CLASS QC1 CONCRETE, ABUTMENT INCLUDING FOOTING (AT STA 31+25)	37	CY	\$500	\$18,500
511	CLASS QC2 CONCRETE, BRIDGE DECK (MAIN SPAN)	32	CY	\$600	\$19,200
511	CLASS QC2 CONCRETE, BRIDGE DECK (RAMP BRIDGE SPANS)	295	CY	\$700	\$206,500
511	CLASS QC1 CONCRETE, PIER ABOVE FOOTING (TRANSITION PIER)	30	C.Y.	\$500	\$15,000
511	CLASS QC1 CONCRETE, PIER ABOVE FOOTING (RAMP BRIDGE SPANS)	84	C.Y.	\$600	\$50,400
511	CLASS QC1 CONCRETE, FOOTING (TRANSITION PIER)	8	C.Y.	\$500	\$4,000
511	CLASS QC1 CONCRETE, FOOTING (RAMP BRIDGE PIERS)	79	C.Y.	\$500	\$39,500
514	MAINTAINING TRAFFIC, MISC: FOR CONSTRUCTION OF ABUTMENTS	1	LUMP	\$20000	\$20,000
516	ELASTOMERIC BEARING WITH INTERNAL LAMINATES ONLY (NEOPRENE)	30	EACH	\$900	\$27,000
530	SPECIAL - STRUCTURE, MISC...: PRE-ENGINEERED PEDESTRIAN BRIDGE	1	LUMP	\$172,500	\$172,500
607	METAL RAILING	644	FT	\$150	\$96,600
690	SPECIAL - WORK INVOLVING HAZARDOUS WASTE	1	LUMP	\$46,150	\$46,150

INCIDENTALS INCLUDE:

PEJF
EXPANSION JOINTS

SUBTOTAL = \$1,006,840
INCIDENTALS = 10%
SUB-TOTAL COST = \$1,107,524
CONTINGENCY = 20%
SUB-TOTAL COST = \$1,329,029
INFLATION CONTINGENCY = 10%

CONTINGENCIES INCLUDE:

POTENTIAL RELOCATION OR PROTECTION OF GAS LINE AT FWD ABUTMENT
POTENTIAL RELOCATION OR PROTECTION OF AT&T FIBER OPTIC LINE AT FWD ABUTMENT
ESTIMATED COSTS DUE TO ACTUAL ENGINEERING

TOTAL CONSTRUCTION COST = \$1,461,932
Cost per Trail Foot = \$3,270.54
FINAL DESIGN COST (11% of Total) = \$160,812
TOTAL COST WITH CONSTRUCTION AND FINAL DESIGN = \$1,622,744

**FREEDOM TRAIL PHASE IV
STRUCTURE 1**

Calculated By: RSW 5/16/2017
Checked By:

AESTHETICS AND LANDSCAPING ONLY

ALT 3: Pre-Fabricated Steel Bridge (125' Span) with Approach Bridge Ramp

This alternate is recommended

Main Span Bridge Length = 125 ft
West Approach Ramp Bridge Length = 322 ft
Total Length = 447 ft

ITEM	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
507	STEEL PILES HP10X42, FURNISHED	160	FT	\$25	\$4,000
507	STEEL PILES HP10X42, DRIVEN	140	FT	\$16	\$2,240
511	CLASS QC1 CONCRETE, FOOTING (SPIRE BASE)	3	C.Y.	\$500	\$1,500
513	STRUCTURAL STEEL, MISC. (SPIRE)	60	FT	\$120	\$7,200
513	STRUCTURAL STEEL, MISC. (SPIRE CABLES)	275	FT	\$4	\$1,031
513	STRUCTURAL STEEL, MISC. (WEATHERING STEEL AESTHETIC TREATMENTS)	44000	LB	\$5	\$220,000
514	SHOP PAINTING AND FIELD TOUCH-UP OF STRUCTURAL STEEL (SPIRE, CABLES)	200	SF	\$20	\$4,000
661	LANDSCAPING	1	LUMP	\$50,000	\$50,000

INCIDENTALS INCLUDE:

SEALING/STAINING OF CONCRETE SURFACES
FORMLINERS FOR SMP LOGO ON ABUTMENTS

SUBTOTAL = \$283,731
INCIDENTALS = 15%
SUB-TOTAL COST = \$326,291
CONTINGENCY = 5%
SUB-TOTAL COST = \$342,605
INFLATION CONTINGENCY = 10%

CONTINGENCIES INCLUDE:

ESTIMATED COSTS DUE TO ACTUAL LANDSAPING/ARCHITECTURE/ENGINEERING

TOTAL CONSTRUCTION COST = \$376,866
Cost per Trail Foot = \$843.10
FINAL DESIGN COST (estimated by EDG) = \$12,500
TOTAL COST WITH CONSTRUCTION AND FINAL DESIGN = \$389,366

**FREEDOM TRAIL PHASE IV
STRUCTURE 1**

Calculated By: WER 1/25/2017
Checked By: SJR 1/27/2017

ALT 4: Pre-Fabricated Steel Bridge (105' Span) with Switchback Approach Bridge Ramp

Main Span Bridge Length = 107.75 ft
West Approach Ramp Bridge Length = 485 ft
Total Length = 592.75 ft

ITEM	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
503	COFFERDAMS AND EXCAVATION BRACING	1	LUMP	\$10,000	\$10,000
503	UNCLASSIFIED EXCAVATION	270	CY	\$40	\$10,800
505	PILE DRIVING EQUIPMENT MOBILIZATION	1	LUMP	\$10,000	\$10,000
507	STEEL PILES HP10X42, FURNISHED	2340	FT	\$25	\$58,500
507	STEEL PILES HP10X42, DRIVEN	2050	FT	\$16	\$32,800
509	EPOXY COATED REINFORCING STEEL	140,875	POUND	\$1.10	\$154,963
511	CLASS QC1 CONCRETE, ABUTMENT INCLUDING FOOTING (EAST ABUT MAIN SPAN)	46	CY	\$500	\$23,000
511	CLASS QC1 CONCRETE, ABUTMENT INCLUDING FOOTING (AT STA 31+25)	30	CY	\$500	\$15,000
511	CLASS QC2 CONCRETE, BRIDGE DECK (MAIN SPAN)	28	CY	\$600	\$16,800
511	CLASS QC2 CONCRETE, BRIDGE DECK (RAMP BRIDGE SPANS)	402	CY	\$700	\$281,400
511	CLASS QC1 CONCRETE, PIER ABOVE FOOTING (TRANSITION PIER)	24	C.Y.	\$500	\$12,000
511	CLASS QC1 CONCRETE, PIER ABOVE FOOTING (RAMP BRIDGE SPANS)	103	C.Y.	\$600	\$61,800
511	CLASS QC1 CONCRETE, FOOTING (TRANSITION PIER)	8	C.Y.	\$500	\$4,000
511	CLASS QC1 CONCRETE, FOOTING (RAMP BRIDGE PIERS)	64	C.Y.	\$500	\$32,000
514	MAINTAINING TRAFFIC, MISC: FOR CONSTRUCTION OF ABUTMENTS	1	LUMP	\$20000	\$20,000
516	ELASTOMERIC BEARING WITH INTERNAL LAMINATES ONLY (NEOPRENE)	40	EACH	\$900	\$36,000
524	DRILLED SHAFTS, 42" DIAMETER, ABOVE BEDROCK	107	FT	\$300	\$32,100
524	DRILLED SHAFTS, 36" DIAMETER, INTO BEDROCK	21	FT	\$375	\$7,875
530	SPECIAL - STRUCTURE, MISC...: PRE-ENGINEERED PEDESTRIAN BRIDGE	1	LUMP	\$149,000	\$149,000
607	METAL RAILING	970	FT	\$150	\$145,500
690	SPECIAL - WORK INVOLVING HAZARDOUS WASTE	1	LUMP	\$46,150	\$46,150

INCIDENTALS INCLUDE:	SUBTOTAL =	\$1,159,688
SEALING/STAINING OF CONCRETE SURFACES	INCIDENTALS =	15%
PEJF	SUB-TOTAL COST =	\$1,333,641
EXPANSION JOINTS	CONTINGENCY =	20%
PIER AND ABUTMENT FORMLINER	SUB-TOTAL COST =	\$1,600,369
	INFLATION CONTINGENCY =	10%

CONTINGENCIES INCLUDE:	TOTAL CONSTRUCTION COST =	\$1,760,406
POTENTIAL RELOCATION OR PROTECTION OF GAS LINE AT FWD ABUTMENT	Cost per Trail Foot =	\$2,969.90
POTENTIAL RELOCATION OR PROTECTION OF AT&T FIBER OPTIC LINE AT FWD ABUTMENT	FINAL DESIGN COST (11% of Total) =	\$193,645
ESTIMATED COSTS DUE TO ACTUAL ENGINEERING	TOTAL COST WITH CONSTRUCTION AND FINAL DESIGN =	\$1,954,051

ms consultants inc.
Freedom Trail IV
Estimate of Probable Cost
Soil and Groundwater Management on the Schipper Property

BID ITEM	UNITS	UNIT PRICE	TOTAL COST
(01) General Conditions			
<i>01-01 Health and Safety Plan</i>	1 LS	\$ 3,000.00	\$ 3,000.00
<i>01-02 Soil and Groundwater Assessment and Management Plan</i>	1 LS	\$ 8,000.00	\$ 8,000.00
(02) Impacted Soil Excavation and Off-Site Disposal			
<i>02-01 Off-Site Disposal</i>	410 TON	\$ 60.00	\$ 24,600.00
<i>02-02 Soil Excavation, Backfilling, and Compaction</i>	310 TON	\$ 30.00	\$ 9,300.00
(03) Off-Site Groundwater Disposal			
<i>03-01 Removal and Off-Site Disposal</i>	1,000 GAL	\$ 1.25	\$ 1,250.00
ESTIMATED PROJECT TOTAL			\$ 46,150.00

FREEDOM TRAIL PHASE IV
BRIDGE NO. 2
CONSTRUCTION AND ENGINEERING COST ESTIMATE
UPDATED 2/8/2017

**FREEDOM TRAIL PHASE IV
STRUCTURE 2
ALT 1: MSE Wall**

JDH 11/30/2016
SJR 12/9/2016
REV. 2/8/2017
Wall Length = 443

ITEM	ITEM EXT.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
202		STRUCTURE REMOVED (EX. LOWER RETAINING WALL AND RETAINED SOIL)	1	LUMP	\$30,000.00	\$30,000
509		EPOXY COATED REINFORCING STEEL	10000	POUND	\$1.10	\$11,000
511		CLASS QC2 CONCRETE, BRIDGE DECK (PARAPET) (ON MSE WALL)	57	C.Y.	\$550.00	\$31,427
452		8" NON-REINFORCED CONCRETE PAVEMENT, CLASS QC1	645	S.Y.	\$60.00	\$38,689
530		PARAPET FORMLINER	279	S.Y.	\$12.00	\$3,347
607		FENCE	443	FT.	\$120.00	\$53,160
840		MECHANICALLY STABILIZED EARTH WALL (INCL. EXC. AND COPING)	7656	S.F.	\$75.00	\$574,172
840		MECHANICALLY STABILIZED EARTH WALL (FORMLINER ONLY)	7656	S.F.	\$5.00	\$38,278

INCIDENTALS INCLUDE:

SEALING OF CONCRETE SURFACES
PEJF
COMPRESSION SEAL
REMOVAL OF 14' PORTION OF BRIDGE PARAPET
EMBANKMENT AND SEEDING

SUBTOTAL = \$780,072
INCIDENTALS = 15%
SUB-TOTAL COST = \$897,083
CONTINGENCY = 15%
SUB-TOTAL COST = \$1,031,645
INFLATION CONTINGENCY = 10%

CONTINGENCIES INCLUDE:

FINAL ENGINEERING

TOTAL COST = \$1,134,810

Cost per Trail Foot = \$2,562

FINAL DESIGN COST (10% of Total) = \$113,480.99

TOTAL COST WITH CONSTRUCTION AND FINAL DESIGN = \$1,248,290.90

FREEDOM TRAIL PHASE IV
STRUCTURE 2
ALT 2: 4-span Bridge with MSE Wall
THIS ALT. IS RECOMMENDED

Bridge Length = 288 JDH 12/8/2016
 Wall Length = 155 SJR 12/9/2016
 Total Length = 443 REV. 2/8/2017
 Max Wall Ht= 11.5

ITEM	ITEM EXT.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
202		STRUCTURE REMOVED (EX. LOWER RETAINING WALL AND RETAINED SOIL)	1	LUMP	\$30,000.00	\$30,000
509		EPOXY COATED REINFORCING STEEL	37755	POUND	\$1.10	\$41,531
511		CLASS QC2 CONCRETE, BRIDGE DECK	105	C.Y.	\$600.00	\$63,117
511		CLASS QC2 CONCRETE, BRIDGE DECK (PARAPET) (ON MSE AND BRIDGE)	57	C.Y.	\$550.00	\$31,427
511		CLASS QC1 CONCRETE, PIER ABOVE FOOTING	36	C.Y.	\$500.00	\$17,851
511		CLASS QC1 CONCRETE, ABUTMENT INCLUDING FOOTING	11	C.Y.	\$500.00	\$5,444
516		ELASTOMERIC BEARING WITH INTERNAL LAMINATES ONLY (NEOPRENE)	10	EACH	\$900.00	\$9,000
452		8" NON-REINFORCED CONCRETE PAVEMENT, CLASS QC1	329	S.Y.	\$60.00	\$19,737
513		STRUCTURAL STEEL MEMBERS, LEVEL 2 (W33x141) (Weathering Steel)	106314	POUND	\$1.60	\$170,102
524		DRILLED SHAFTS, 42" DIAMETER, ABOVE BEDROCK	26	FT.	\$300.00	\$7,800
524		DRILLED SHAFTS, 36" DIAMETER, INTO BEDROCK	24	FT.	\$375.00	\$9,000
530		PARAPET FORMLINER	279	S.Y.	\$12.00	\$3,347
607		FENCE	731	FT.	\$120.00	\$87,720
840		MECHANICALLY STABILIZED EARTH WALL (INCL. EXC. AND COPING)	1273	S.F.	\$75.00	\$95,464
840		MECHANICALLY STABILIZED EARTH WALL (FORMLINER ONLY)	1273	S.F.	\$5.00	\$6,364

INCIDENTALS INCLUDE:

SEALING OF CONCRETE SURFACES
 PEJF
 COMPRESSION SEAL
 REMOVAL OF 14' PORTION OF BRIDGE PARAPET
 EMBANKMENT AND SEEDING
 SHEAR STUDS

SUBTOTAL = \$597,905
 INCIDENTALS = 15%
 SUB-TOTAL COST = \$687,590
 CONTINGENCY = 15%
 SUB-TOTAL COST = \$790,729
 INFLATION CONTINGENCY = 10%
 TOTAL COST = \$869,802

CONTINGENCIES INCLUDE:

EXCAVATION BRACING (LIKELY NOT NEEDED)
 PILING AT ABUTMENT (LIKELY NOT NEEDED)
 FINAL ENGINEERING

Cost per Trail Foot = \$1,963
 FINAL DESIGN COST (10% of Total) = \$86,980.19

TOTAL COST WITH CONSTRUCTION AND FINAL DESIGN = \$956,782.13

**FREEDOM TRAIL PHASE IV
STRUCTURE 2
ALT 3: 5-span Bridge with MSE Wall**

Bridge Length = 360 JDH 12/7/2016
 Wall Length = 83 SJR 12/9/2016
 Total Length = 443 REV. 2/8/2017
 Max Wall Ht= 7.2

ITEM	ITEM EXT.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
202		STRUCTURE REMOVED (EX. LOWER RETAINING WALL AND RETAINED SOIL)	1	LUMP	\$30,000.00	\$30,000
509		EPOXY COATED REINFORCING STEEL	43532	POUND	\$1.10	\$47,885
511		CLASS QC2 CONCRETE, BRIDGE DECK	130	C.Y.	\$600.00	\$78,050
511		CLASS QC2 CONCRETE, BRIDGE DECK (PARAPET) (ON MSE AND BRIDGE)	57	C.Y.	\$550.00	\$31,427
511		CLASS QC1 CONCRETE, PIER ABOVE FOOTING	41	C.Y.	\$500.00	\$20,514
511		CLASS QC1 CONCRETE, ABUTMENT INCLUDING FOOTING	11	C.Y.	\$500.00	\$5,444
516		ELASTOMERIC BEARING WITH INTERNAL LAMINATES ONLY (NEOPRENE)	12	EACH	\$900.00	\$10,800
452		8" NON-REINFORCED CONCRETE PAVEMENT, CLASS QC1	182	S.Y.	\$60.00	\$10,901
513		STRUCTURAL STEEL MEMBERS, LEVEL 2 (W33x141) (Weathering Steel)	132709	POUND	\$1.60	\$212,335
524		DRILLED SHAFTS, 42" DIAMETER, ABOVE BEDROCK	36	FT.	\$300.00	\$10,800
524		DRILLED SHAFTS, 36" DIAMETER, INTO BEDROCK	30	FT.	\$375.00	\$11,250
530		PARAPET FORMLINER	279	S.Y.	\$12.00	\$3,347
607		FENCE	803	FT.	\$120.00	\$96,360
840		MECHANICALLY STABILIZED EARTH WALL (INCL. EXC. AND COPING)	550	S.F.	\$85.00	\$46,719
840		MECHANICALLY STABILIZED EARTH WALL (FORMLINER ONLY)	550	S.F.	\$5.00	\$2,748

INCIDENTALS INCLUDE:

SEALING OF CONCRETE SURFACES
 PEJF
 COMPRESSION SEAL
 REMOVAL OF 14' PORTION OF BRIDGE PARAPET
 EMBANKMENT AND SEEDING
 SHEAR STUDS

SUBTOTAL = \$618,581
 INCIDENTALS = 15%
 SUB-TOTAL COST = \$711,368
 CONTINGENCY = 15%
 SUB-TOTAL COST = \$818,074
 INFLATION CONTINGENCY = 10%
 TOTAL COST = \$899,881

CONTINGENCIES INCLUDE:

EXCAVATION BRACING (LIKELY NOT NEEDED)
 PILING AT ABUTMENT (LIKELY NOT NEEDED)
 FINAL ENGINEERING

Cost per Trail Foot = \$2,031
 FINAL DESIGN COST (10% of Total) = \$89,988.10

TOTAL COST WITH CONSTRUCTION AND FINAL DESIGN = \$989,869.09

FREEDOM TRAIL PHASE IV

BRIDGE NO. 3

CONSTRUCTION AND ENGINEERING COST ESTIMATE

UPDATED 4/13/2017

**FREEDOM TRAIL PHASE IV
STRUCTURE 3
ALT 1: 2-SPAN BRIDGE WITH DRILLED SHAFTS AND APPROACH MSE WALLS**

Bridge Length = 143 JDH 12/15/2016
 Wall Length = 405 SJR 12/16/2016
 Total Length = 548 REV. 4/13/2017
 Max Wall Ht= 25

ITEM	ITEM EXT.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
503		UNCLASSIFIED EXCAVATION	37	C.Y.	\$40.00	\$1,481
509		EPOXY COATED REINFORCING STEEL	40025	POUND	\$1.10	\$44,028
511		CLASS QC2 CONCRETE, BRIDGE DECK	55	C.Y.	\$600.00	\$33,259
511		CLASS QC2 CONCRETE, BRIDGE DECK (PARAPET) (ON MSE AND BRIDGE)	141	C.Y.	\$550.00	\$77,752
511		CLASS QC1 CONCRETE, PIER ABOVE FOOTING	19	C.Y.	\$500.00	\$9,461
511		CLASS QC1 CONCRETE, ABUTMENT INCLUDING FOOTING	11	C.Y.	\$500.00	\$5,444
516		ELASTOMERIC BEARING WITH INTERNAL LAMINATES ONLY (NEOPRENE)	6	EACH	\$900.00	\$5,400
452		8" NON-REINFORCED CONCRETE PAVEMENT, CLASS QC1	630	S.Y.	\$60.00	\$37,800
513		STRUCTURAL STEEL MEMBERS, LEVEL 2 (W33x141) (Weathering Steel)	53157	POUND	\$1.60	\$85,051
524		DRILLED SHAFTS, 42" DIAMETER, ABOVE BEDROCK	6	FT.	\$300.00	\$1,800
524		DRILLED SHAFTS, 36" DIAMETER, INTO BEDROCK	12	FT.	\$375.00	\$4,500
530		PARAPET FORMLINER	690	S.Y.	\$12.00	\$8,281
607		FENCE	1096	FT.	\$120.00	\$131,520
MISC		AT&T FIBER UTILITY RELOCATION AT MSE WALL	1	LUMP	\$112000	\$112,000
840		MECHANICALLY STABILIZED EARTH WALL (INCL. EXCAV. AND COPING)	12132.5	S.F.	\$75.00	\$741,375
840		MECHANICALLY STABILIZED EARTH WALL (FORMLINER ONLY)	12132.5	S.F.	\$1.00	\$12,133

SUBTOTAL = \$1,311,285

INCIDENTALS INCLUDE:

SEALING OF CONCRETE SURFACES
 PEJF
 COMPRESSION SEAL
 SHEAR STUDS

INCIDENTALS = 10%
 SUB-TOTAL COST = \$1,442,414
 CONTINGENCY = 15%
 SUB-TOTAL COST = \$1,658,776
 INFLATION CONTINGENCY = 10%

CONTINGENCIES INCLUDE:

EXCAVATION BRACING (LIKELY NOT NEEDED)
 RAILROAD INSURANCE
 RAILROAD REVIEWS
 FINAL ENGINEERING OF BRIDGE AND WALLS
 AT&T RELOCATION PLANS AND REVIEWS

TOTAL COST = \$1,824,653
 Cost per Trail Foot = \$3,330
 FINAL DESIGN COST (10% of Total) = \$182,465.34

TOTAL COST WITH CONSTRUCTION AND FINAL DESIGN = \$2,007,118.72

**FREEDOM TRAIL PHASE IV
STRUCTURE 3
ALT 2: 3-SPAN BRIDGE WITH DRILLED SHAFTS AND APPROACH MSE WALLS**

Bridge Length = 216 JDH 12/15/2016
 Wall Length = 332 SJR 12/16/2016
 Total Length = 548 REV. 4/13/2017
 Max Wall Ht= 21

ITEM	ITEM EXT.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
503		UNCLASSIFIED EXCAVATION	56	C.Y.	\$40.00	\$2,222
509		EPOXY COATED REINFORCING STEEL	46216	POUND	\$1.10	\$50,838
511		CLASS QC2 CONCRETE, BRIDGE DECK	81	C.Y.	\$600.00	\$48,400
511		CLASS QC2 CONCRETE, BRIDGE DECK (PARAPET) (ON MSE AND BRIDGE)	141	C.Y.	\$550.00	\$77,752
511		CLASS QC1 CONCRETE, PIER ABOVE FOOTING	27	C.Y.	\$500.00	\$13,274
511		CLASS QC1 CONCRETE, ABUTMENT INCLUDING FOOTING	11	C.Y.	\$500.00	\$5,444
516		ELASTOMERIC BEARING WITH INTERNAL LAMINATES ONLY (NEOPRENE)	8	EACH	\$900.00	\$7,200
452		8" NON-REINFORCED CONCRETE PAVEMENT, CLASS QC1	516	S.Y.	\$60.00	\$30,987
513		STRUCTURAL STEEL MEMBERS, LEVEL 2 (W33x141) (Weathering Steel)	79919	POUND	\$1.60	\$127,870
524		DRILLED SHAFTS, 42" DIAMETER, ABOVE BEDROCK	9	FT.	\$300.00	\$2,700
524		DRILLED SHAFTS, 36" DIAMETER, INTO BEDROCK	18	FT.	\$375.00	\$6,750
530		PARAPET FORMLINER	690	S.Y.	\$12.00	\$8,281
607		FENCE	1096	FT.	\$120.00	\$131,520
MISC		AT&T FIBER UTILITY RELOCATION AT MSE WALL	1	LUMP	\$102000	\$102,000
840		MECHANICALLY STABILIZED EARTH WALL (INCL. EXCAV. AND COPING)	8636	S.F.	\$75.00	\$528,580
840		MECHANICALLY STABILIZED EARTH WALL (FORMLINER ONLY)	8636	S.F.	\$5.00	\$43,180

SUBTOTAL = \$1,186,998

INCIDENTALS INCLUDE:

SEALING OF CONCRETE SURFACES
 PEJF
 COMPRESSION SEAL
 SHEAR STUDS

INCIDENTALS = 10%
 SUB-TOTAL COST = \$1,305,698
 CONTINGENCY = 15%
 SUB-TOTAL COST = \$1,501,552
 INFLATION CONTINGENCY = 10%

CONTINGENCIES INCLUDE:

EXCAVATION BRACING (LIKELY NOT NEEDED)
 RAILROAD INSURANCE
 RAILROAD REVIEWS
 FINAL ENGINEERING OF BRIDGE AND WALLS
 AT&T RELOCATION PLANS AND REVIEWS

TOTAL COST = \$1,651,707
 Cost per Trail Foot = \$3,014
 FINAL DESIGN COST (10% of Total) = \$165,170.74

TOTAL COST WITH CONSTRUCTION AND FINAL DESIGN = \$1,816,878.16

**FREEDOM TRAIL PHASE IV
STRUCTURE 3
ALT 3: 4-SPAN BRIDGE WITH DRILLED SHAFTS AND APPROACH MSE WALLS**

Bridge Length = 288 JDH 12/15/2016
 Wall Length = 260 SJR 12/16/2016
 Total Length = 548 REV. 4/13/2017
 Max Wall Ht= 17

ITEM	ITEM EXT.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
503		UNCLASSIFIED EXCAVATION	74	C.Y.	\$40.00	\$2,963
509		EPOXY COATED REINFORCING STEEL	52207	POUND	\$1.10	\$57,428
511		CLASS QC2 CONCRETE, BRIDGE DECK	106	C.Y.	\$600.00	\$63,333
511		CLASS QC2 CONCRETE, BRIDGE DECK (PARAPET) (ON MSE AND BRIDGE)	141	C.Y.	\$550.00	\$77,752
511		CLASS QC1 CONCRETE, PIER ABOVE FOOTING	33	C.Y.	\$500.00	\$16,652
511		CLASS QC1 CONCRETE, ABUTMENT INCLUDING FOOTING	11	C.Y.	\$500.00	\$5,444
516		ELASTOMERIC BEARING WITH INTERNAL LAMINATES ONLY (NEOPRENE)	10	EACH	\$900.00	\$9,000
452		8" NON-REINFORCED CONCRETE PAVEMENT, CLASS QC1	404	S.Y.	\$60.00	\$24,267
513		STRUCTURAL STEEL MEMBERS, LEVEL 2 (W33x141) (Weathering Steel)	106314	POUND	\$1.60	\$170,102
524		DRILLED SHAFTS, 42" DIAMETER, ABOVE BEDROCK	12	FT.	\$300.00	\$3,600
524		DRILLED SHAFTS, 36" DIAMETER, INTO BEDROCK	24	FT.	\$375.00	\$9,000
530		PARAPET FORMLINER	690	S.Y.	\$12.00	\$8,281
607		FENCE	1096	FT.	\$120.00	\$131,520
MISC		AT&T FIBER UTILITY RELOCATION AT MSE WALL	1	LUMP	\$94000	\$94,000
840		MECHANICALLY STABILIZED EARTH WALL (INCL. EXCAV. AND COPING)	5723.5	S.F.	\$75.00	\$350,901
840		MECHANICALLY STABILIZED EARTH WALL (FORMLINER ONLY)	5723.5	S.F.	\$5.00	\$28,618

SUBTOTAL = \$1,052,861

INCIDENTALS INCLUDE:

SEALING OF CONCRETE SURFACES
 PEJF
 COMPRESSION SEAL
 SHEAR STUDS

INCIDENTALS = 10%
 SUB-TOTAL COST = \$1,158,147
 CONTINGENCY = 15%
 SUB-TOTAL COST = \$1,331,869
 INFLATION CONTINGENCY = 10%

CONTINGENCIES INCLUDE:

EXCAVATION BRACING (LIKELY NOT NEEDED)
 RAILROAD INSURANCE
 RAILROAD REVIEWS
 FINAL ENGINEERING OF BRIDGE AND WALLS
 AT&T RELOCATION PLANS AND REVIEWS

TOTAL COST = \$1,465,056
 Cost per Trail Foot = \$2,673
 FINAL DESIGN COST (10% of Total) = \$146,505.62

TOTAL COST WITH CONSTRUCTION AND FINAL DESIGN = \$1,611,561.77

**FREEDOM TRAIL PHASE IV
STRUCTURE 3
ALT 4: 5-SPAN BRIDGE WITH DRILLED SHAFTS AND APPROACH MSE WALLS**

Bridge Length = 360 JDH 12/15/2016
 Wall Length = 188 SJR 12/16/2016
 Total Length = 548 REV 4/13/2017
 Max Wall Ht= 13

ITEM	ITEM EXT.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
503		UNCLASSIFIED EXCAVATION	93	C.Y.	\$40.00	\$3,704
509		EPOXY COATED REINFORCING STEEL	58041	POUND	\$1.10	\$63,845
511		CLASS QC2 CONCRETE, BRIDGE DECK	130	C.Y.	\$600.00	\$78,267
511		CLASS QC2 CONCRETE, BRIDGE DECK (PARAPET) (ON MSE AND BRIDGE)	141	C.Y.	\$550.00	\$77,752
511		CLASS QC1 CONCRETE, PIER ABOVE FOOTING	39	C.Y.	\$500.00	\$19,505
511		CLASS QC1 CONCRETE, ABUTMENT INCLUDING FOOTING	11	C.Y.	\$500.00	\$5,444
516		ELASTOMERIC BEARING WITH INTERNAL LAMINATES ONLY (NEOPRENE)	12	EACH	\$900.00	\$10,800
452		8" NON-REINFORCED CONCRETE PAVEMENT, CLASS QC1	292	S.Y.	\$60.00	\$17,547
513		STRUCTURAL STEEL MEMBERS, LEVEL 2 (W33x141) (Weathering Steel)	132709	POUND	\$1.60	\$212,335
524		DRILLED SHAFTS, 42" DIAMETER, ABOVE BEDROCK	15	FT.	\$300.00	\$4,500
524		DRILLED SHAFTS, 36" DIAMETER, INTO BEDROCK	30	FT.	\$375.00	\$11,250
530		PARAPET FORMLINER	690	S.Y.	\$12.00	\$8,281
607		FENCE	1096	FT.	\$120.00	\$131,520
MISC		AT&T FIBER UTILITY RELOCATION AT MSE WALL	1	LUMP	\$85000	\$85,000
840		MECHANICALLY STABILIZED EARTH WALL (INCL. EXCAV. AND COPING)	3397.5	S.F.	\$75.00	\$208,944
840		MECHANICALLY STABILIZED EARTH WALL (FORMLINER ONLY)	3397.5	S.F.	\$5.00	\$16,988

SUBTOTAL = \$955,681

INCIDENTALS INCLUDE:

SEALING OF CONCRETE SURFACES
 PEJF
 COMPRESSION SEAL
 SHEAR STUDS

INCIDENTALS = 10%
 SUB-TOTAL COST = \$1,051,249
 CONTINGENCY = 15%
 SUB-TOTAL COST = \$1,208,937
 INFLATION CONTINGENCY = 10%

CONTINGENCIES INCLUDE:

EXCAVATION BRACING (LIKELY NOT NEEDED)
 RAILROAD INSURANCE
 RAILROAD REVIEWS
 FINAL ENGINEERING OF BRIDGE AND WALLS
 AT&T RELOCATION PLANS AND REVIEWS

TOTAL COST = \$1,329,830
 Cost per Trail Foot = \$2,427
 FINAL DESIGN COST (10% of Total) = \$132,983.05

TOTAL COST WITH CONSTRUCTION AND FINAL DESIGN = \$1,462,813.54

**FREEDOM TRAIL PHASE IV
STRUCTURE 3
ALT 5: 6-SPAN BRIDGE WITH DRILLED SHAFTS AND APPROACH MSE WALLS**

Bridge Length = 432 JDH 1/16/2017
 Wall Length = 116 SJR 2/7/2017
 Total Length = 548 REV 4/13/2017
 Max Wall Ht= 9

THIS ALT IS RECOMMENDED

ITEM	ITEM EXT.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
503		UNCLASSIFIED EXCAVATION	111	C.Y.	\$40.00	\$4,444
509		EPOXY COATED REINFORCING STEEL	64660	POUND	\$1.10	\$71,126
511		CLASS QC2 CONCRETE, BRIDGE DECK	155	C.Y.	\$600.00	\$93,200
511		CLASS QC2 CONCRETE, BRIDGE DECK (PARAPET) (ON MSE AND BRIDGE)	141	C.Y.	\$550.00	\$77,752
511		CLASS QC1 CONCRETE, PIER ABOVE FOOTING	50	C.Y.	\$500.00	\$24,977
511		CLASS QC1 CONCRETE, ABUTMENT INCLUDING FOOTING	11	C.Y.	\$500.00	\$5,444
516		ELASTOMERIC BEARING WITH INTERNAL LAMINATES ONLY (NEOPRENE)	14	EACH	\$900.00	\$12,600
452		8" NON-REINFORCED CONCRETE PAVEMENT, CLASS QC1	180	S.Y.	\$60.00	\$10,827
513		STRUCTURAL STEEL MEMBERS, LEVEL 2 (W33x141) (Weathering Steel)	159104	POUND	\$1.60	\$254,567
524		DRILLED SHAFTS, 42" DIAMETER, ABOVE BEDROCK	18	FT.	\$300.00	\$5,400
524		DRILLED SHAFTS, 36" DIAMETER, INTO BEDROCK	36	FT.	\$375.00	\$13,500
530		PARAPET FORMLINER	690	S.Y.	\$12.00	\$8,281
607		FENCE	1096	FT.	\$120.00	\$131,520
MISC		AT&T FIBER UTILITY RELOCATION AT MSE WALL	1	LUMP	\$75000	\$75,000
840		MECHANICALLY STABILIZED EARTH WALL (INCL. EXCAV. AND COPING)	1647.5	S.F.	\$75.00	\$101,920
840		MECHANICALLY STABILIZED EARTH WALL (FORMLINER ONLY)	1647.5	S.F.	\$5.00	\$8,238

SUBTOTAL = \$898,797

INCIDENTALS INCLUDE:

SEALING OF CONCRETE SURFACES
 PEJF
 COMPRESSION SEAL
 SHEAR STUDS

INCIDENTALS = 10%
 SUB-TOTAL COST = \$988,676
 CONTINGENCY = 15%
 SUB-TOTAL COST = \$1,136,978
 INFLATION CONTINGENCY = 10%

CONTINGENCIES INCLUDE:

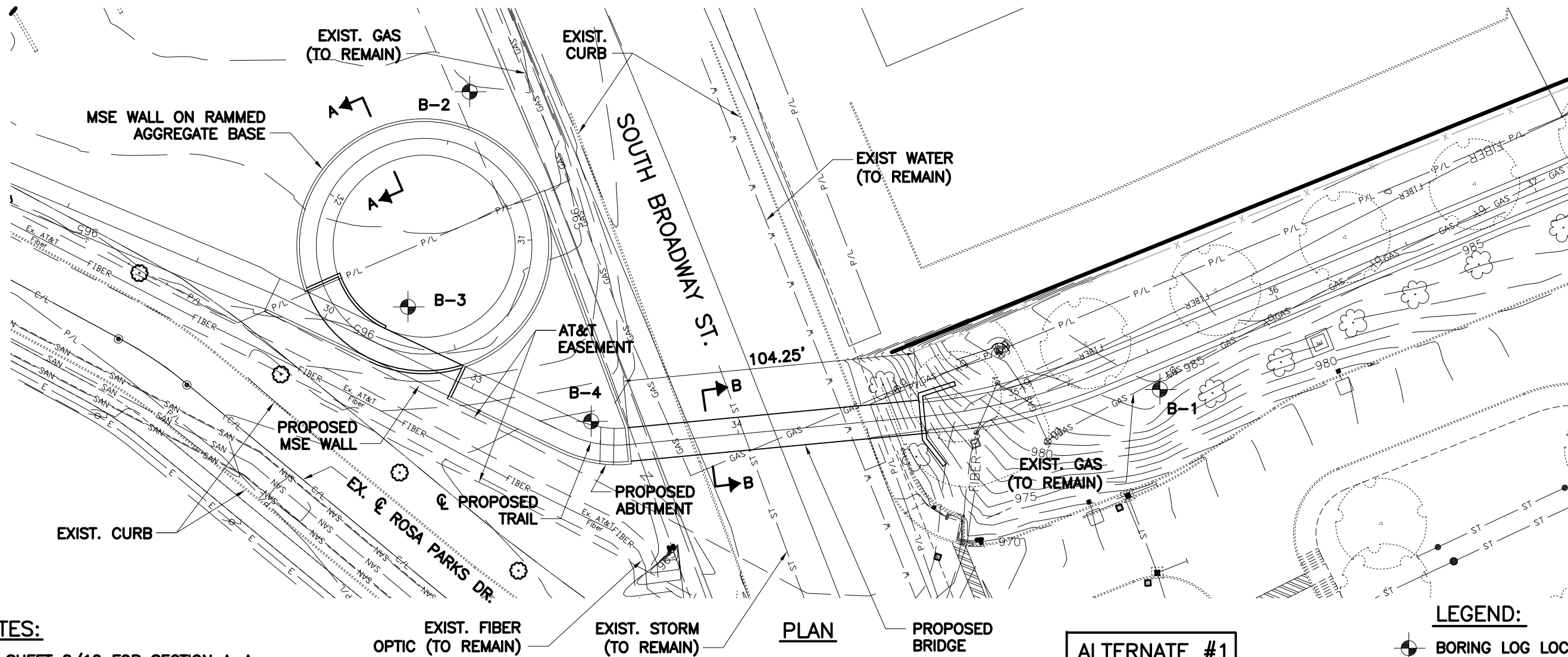
EXCAVATION BRACING (LIKELY NOT NEEDED)
 RAILROAD INSURANCE
 RAILROAD REVIEWS
 FINAL ENGINEERING OF BRIDGE AND WALLS
 AT&T RELOCATION PLANS AND REVIEWS

TOTAL COST = \$1,250,676
 Cost per Trail Foot = \$2,282
 FINAL DESIGN COST (10% of Total) = \$125,067.57

TOTAL COST WITH CONSTRUCTION AND FINAL DESIGN = \$1,375,743.25

Appendix C

Preliminary Plans for Bridges #1, #2 and #3



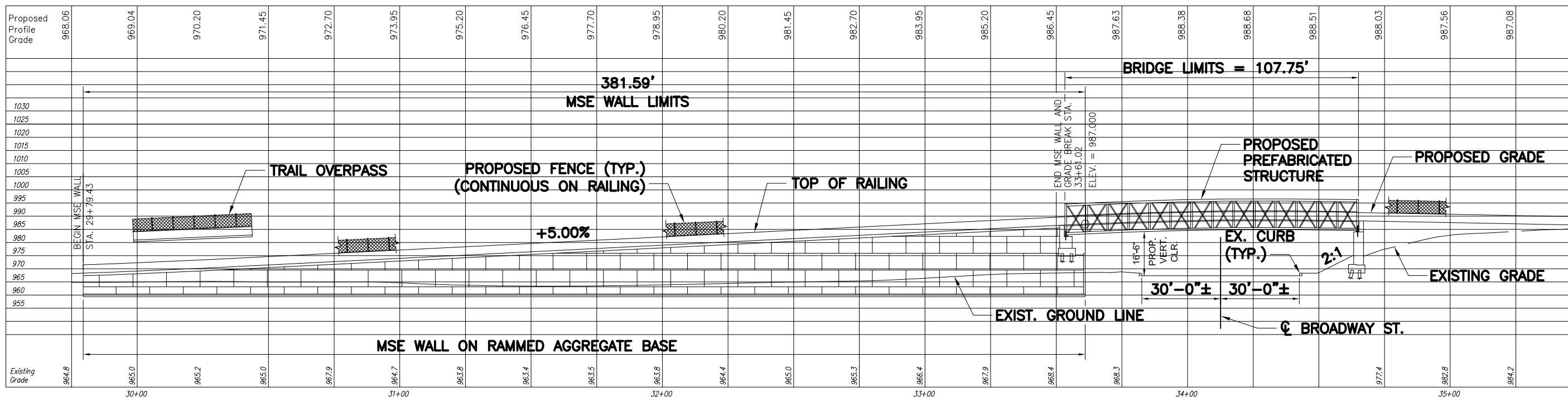
NOTES:

SEE SHEET 8/12 FOR SECTION A-A.
SEE SHEET 9/12 FOR SECTION B-B.

LEGEND:



ALTERNATE #1



DEVELOPED MSE WALL PROFILE

REVISIONS	MARK	DATE	DESCRIPTION

SUMMIT METRO PARKS

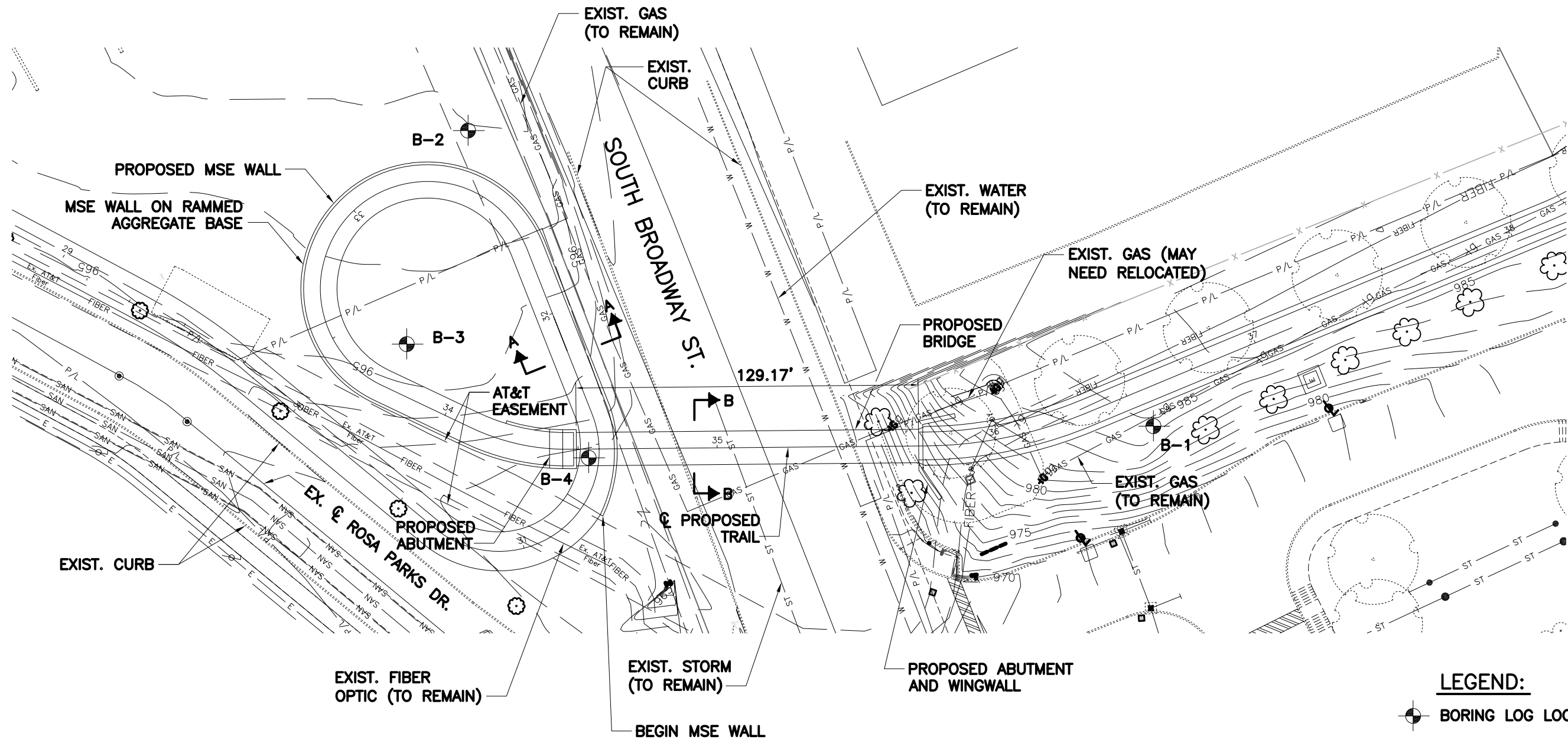
SUMMIT METRO PARKS, CITY OF AKRON
SUMMIT COUNTY, OHIO
FREEDOM TRAIL PHASE IV
BRIDGE NO. 1 PLAN ALIGNMENT NO. 1

DATE
2/15/17

SCALE
None

JOB NO.
60-08322-00

SHEET
1/12



PLAN

LEGEND:

⊙ BORING LOG LOCATION

ALTERNATE #2

NOTES:

SEE SHEET 8/12 FOR SECTION A-A.
SEE SHEET 9/12 FOR SECTION B-B.

REVISIONS	MARK	DATE	DESCRIPTION

SUMMIT METRO PARKS

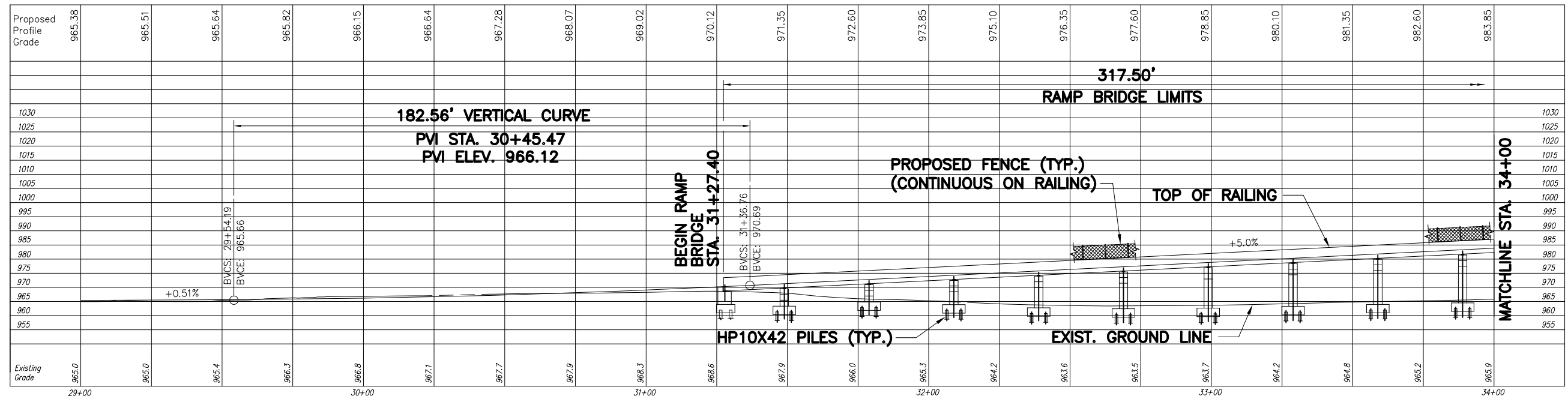
SUMMIT METRO PARKS, CITY OF AKRON
SUMMIT COUNTY, OHIO
FREEDOM TRAIL PHASE IV
BRIDGE NO. 1 PLAN ALIGNMENT NO. 2

DATE
2/15/17

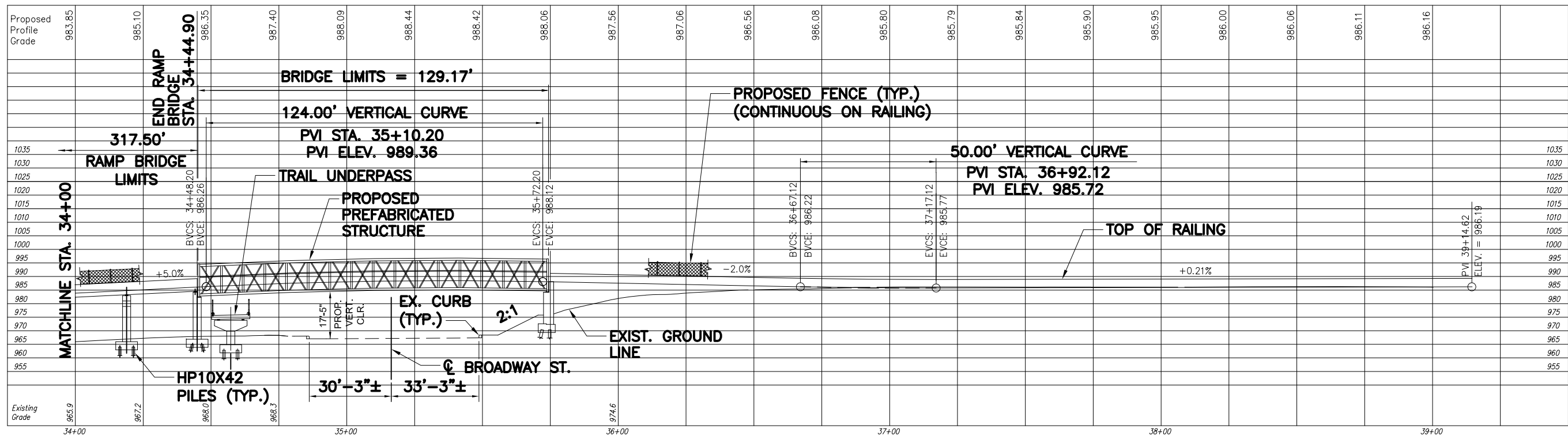
SCALE
None

JOB NO.
60-08322-00

SHEET
2/12



DEVELOPED MSE WALL PROFILE



DEVELOPED MSE WALL PROFILE

ALTERNATE #3

REVISIONS

MARK DATE DESCRIPTION

SUMMIT METRO PARKS

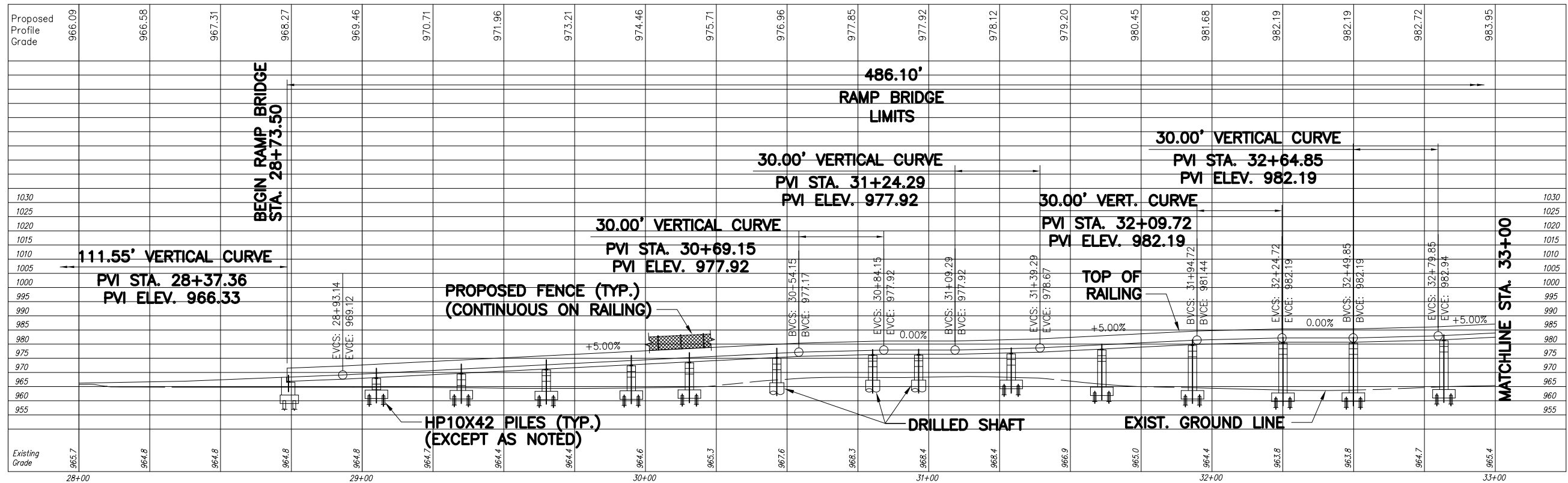
SUMMIT METRO PARKS, CITY OF AKRON
SUMMIT COUNTY, OHIO
FREEDOM TRAIL PHASE IV
BRIDGE NO. 1 PROFILE ALIGNMENT NO.3

DATE
2/15/17

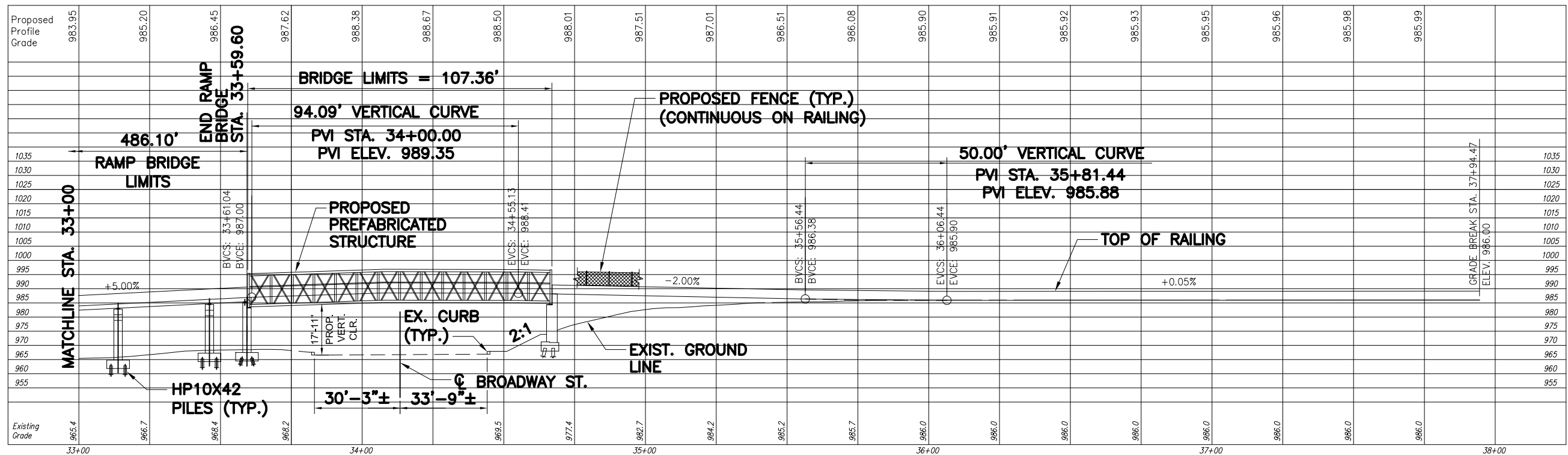
SCALE
None

JOB NO.
60-08322-00

SHEET
5/12



DEVELOPED MSE WALL PROFILE



DEVELOPED MSE WALL PROFILE

ALTERNATE #4

MARK	DATE	DESCRIPTION

SUMMIT METRO PARKS

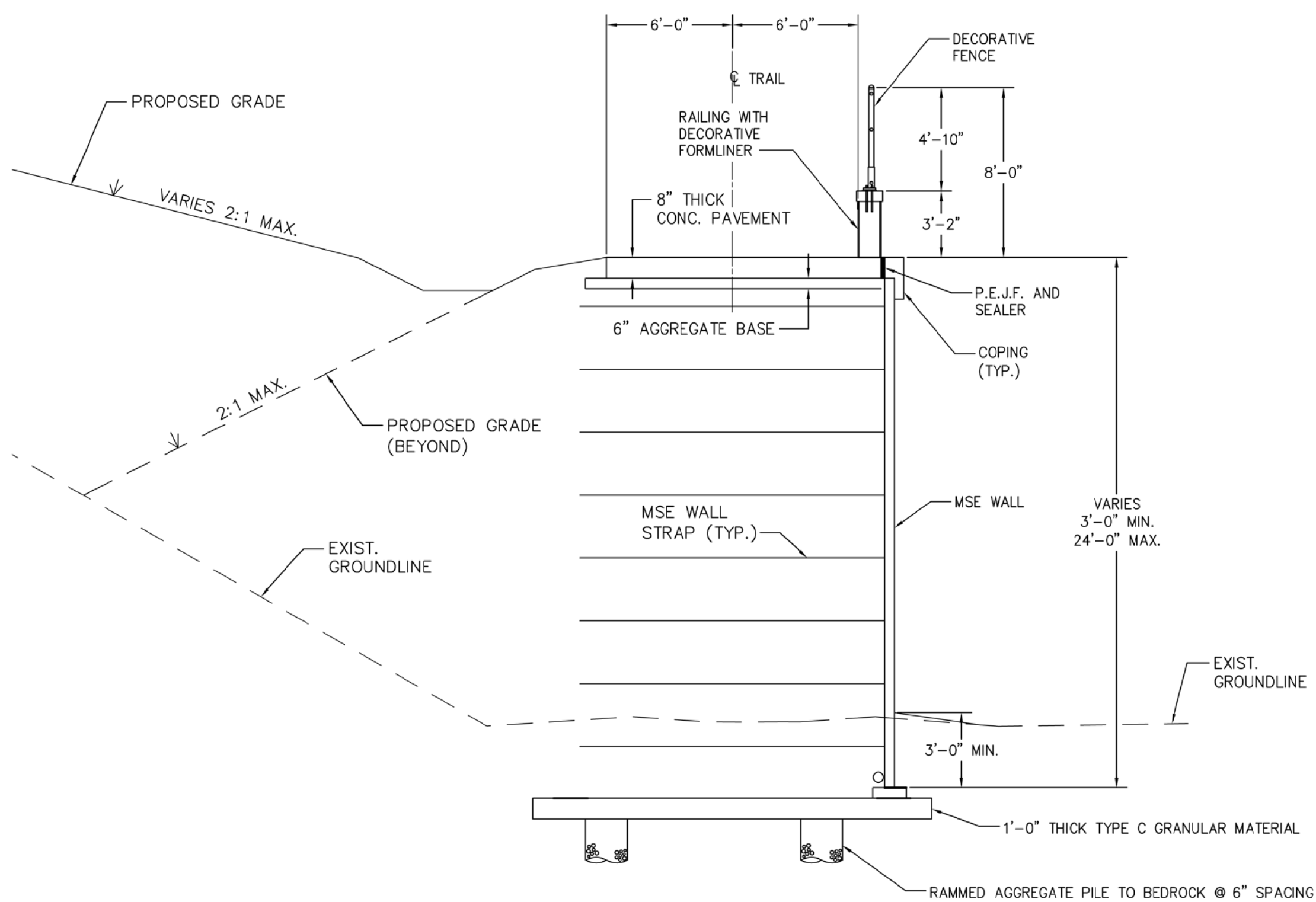
SUMMIT METRO PARKS, CITY OF AKRON
SUMMIT COUNTY, OHIO
FREEDOM TRAIL PHASE IV
BRIDGE NO. 1 PROFILE ALIGNMENT NO. 4

DATE
2/15/17

SCALE
None

JOB NO.
60-08322-00

SHEET
7/12



TYPICAL TRAIL SECTION A-A

ALTERNATES #1 & #2

REVISIONS
MARK DATE DESCRIPTION

SUMMIT METRO PARKS

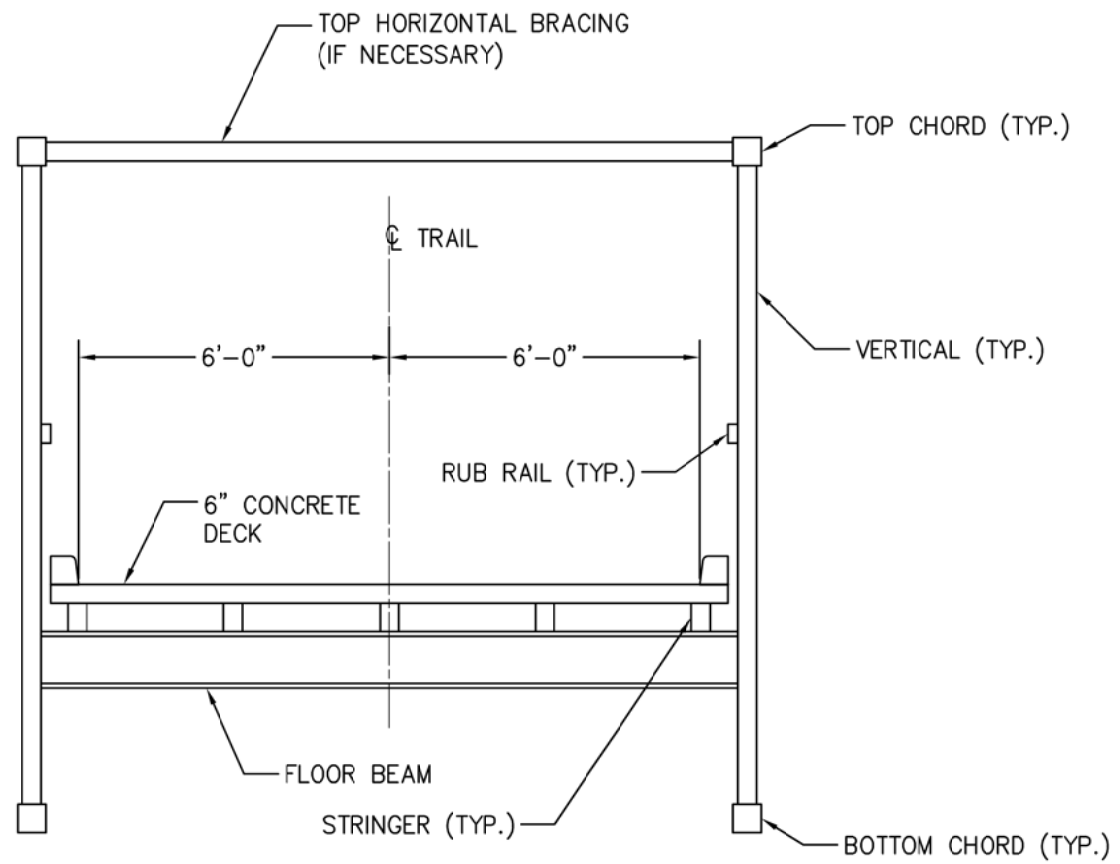
SUMMIT METRO PARKS, CITY OF AKRON
SUMMIT COUNTY, OHIO
FREEDOM TRAIL PHASE IV
BRIDGE NO. 1 TYPICAL TRAIL SECTION

DATE
2/15/17

SCALE
None

JOB NO.
60-08322-00

SHEET
8/12



TYPICAL BRIDGE SECTION B-B

ALTERNATES #1 THRU #4

REVISIONS

MARK | DATE | DESCRIPTION

SUMMIT METRO PARKS

SUMMIT METRO PARKS, CITY OF AKRON
SUMMIT COUNTY, OHIO
FREEDOM TRAIL PHASE IV
BRIDGE NO. 1 TYPICAL TRAIL SECTION

DATE

2/15/17

SCALE

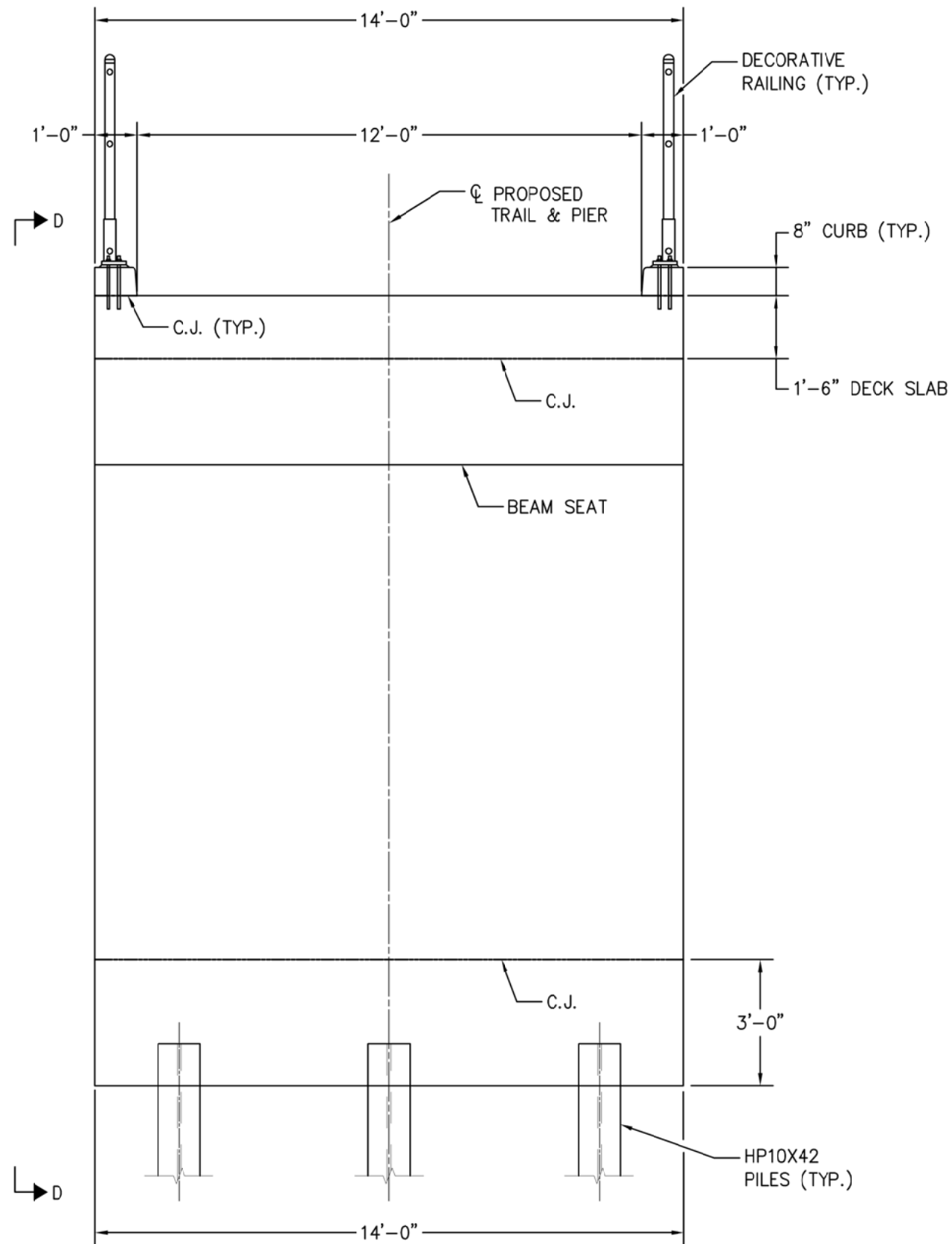
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JOB NO.

60-08322-00

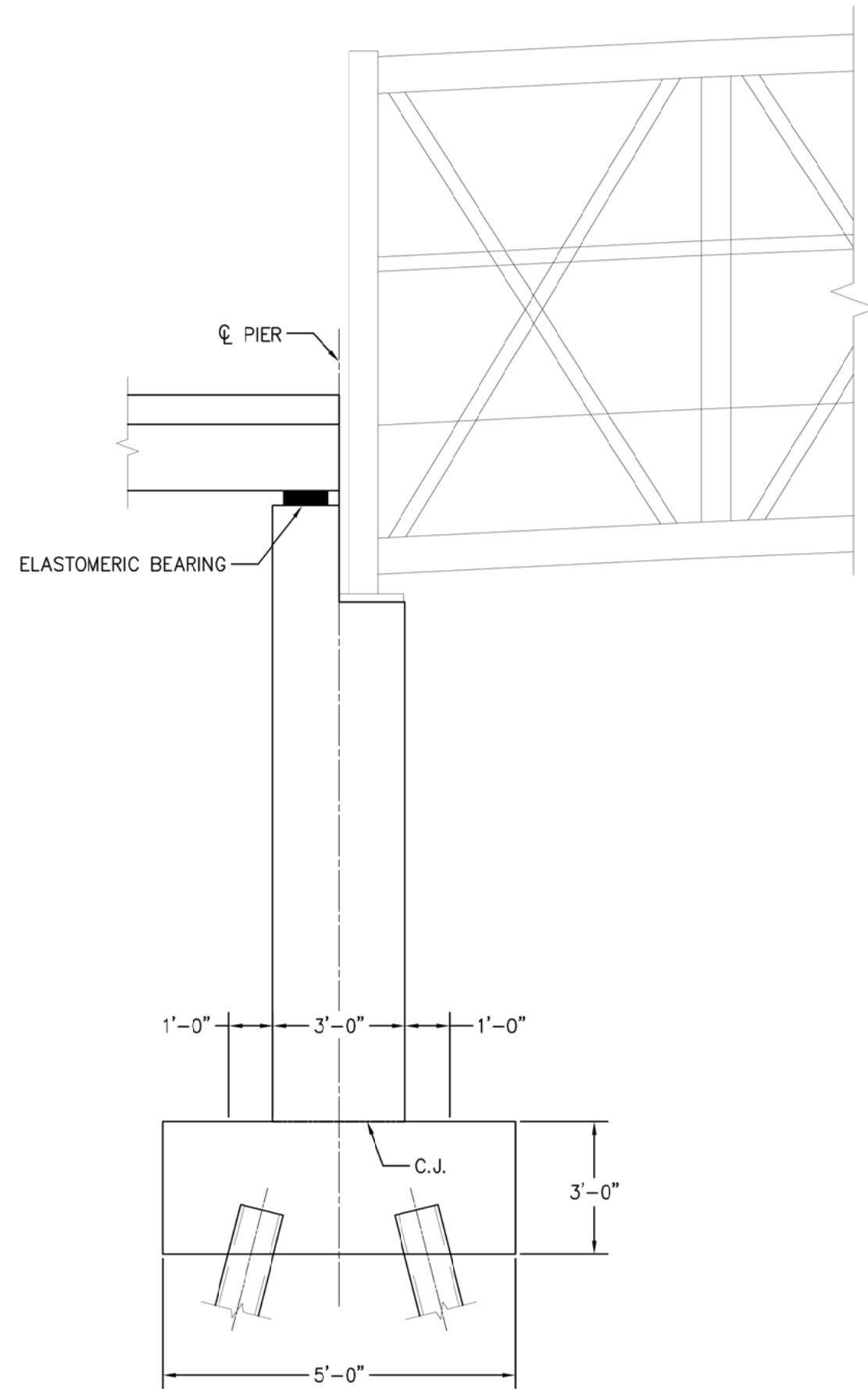
SHEET

9/12



TRANSITION PIER SECTION C-C

ALTERNATE #3 & #4



VIEW D-D
(RAILING NOT SHOWN)

REVISIONS

MARK | DATE | DESCRIPTION

SUMMIT METRO PARKS

SUMMIT METRO PARKS, CITY OF AKRON
SUMMIT COUNTY, OHIO
FREEDOM TRAIL PHASE IV
BRIDGE NO. 1 TYPICAL TRAIL SECTION

DATE

2/15/17

SCALE

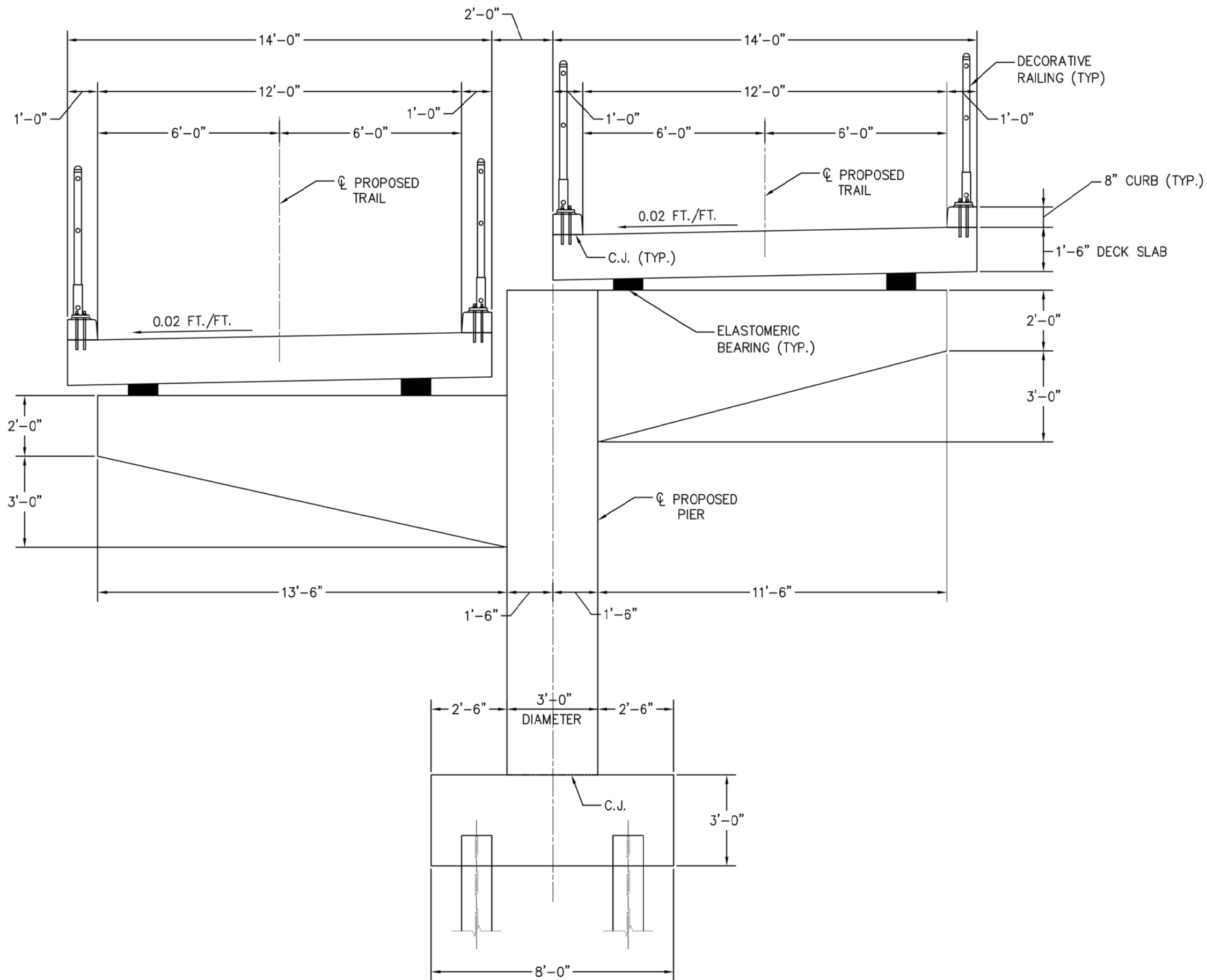
None

JOB NO.

60-08322-00

SHEET

11/12



TYPICAL RAMP SECTION G-G

ALTERNATE #4

REVISIONS

MARK | DATE | DESCRIPTION

SUMMIT METRO PARKS

SUMMIT METRO PARKS, CITY OF AKRON
SUMMIT COUNTY, OHIO
FREEDOM TRAIL PHASE IV
BRIDGE NO. 1 TYPICAL TRAIL SECTION

DATE

2/15/17

SCALE

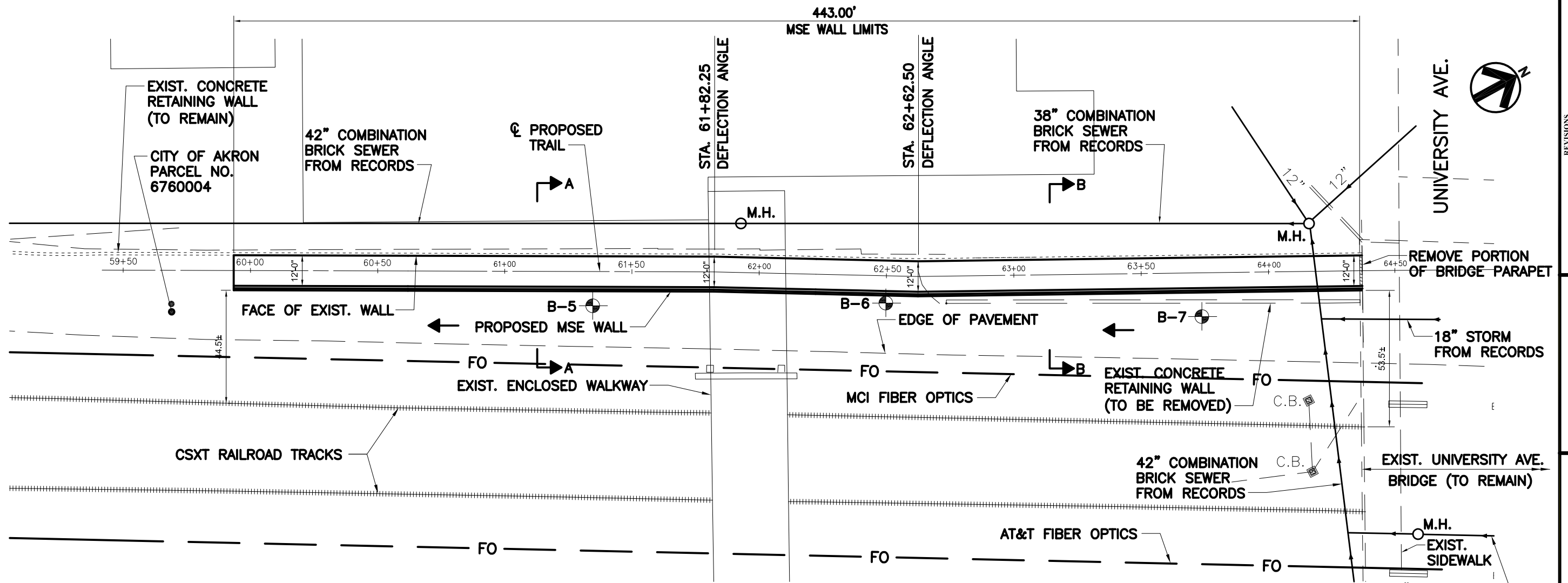
None

JOB NO.

60-08322-00

SHEET

12/12



PLAN

ALTERNATE #1

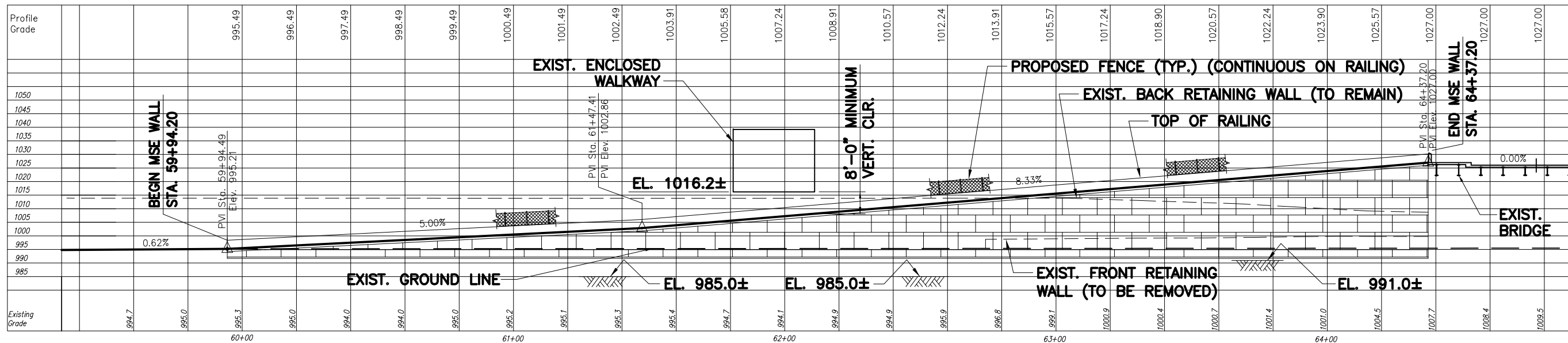
LEGEND:

BORING LOG LOCATION

TOP OF ROCK

NOTES:

SEE SHEET 3/5 FOR SECTION A-A.
SEE SHEET 4/5 FOR SECTION B-B.



PROFILE

REVISIONS

MARK DATE DESCRIPTION

SUMMIT METRO PARKS

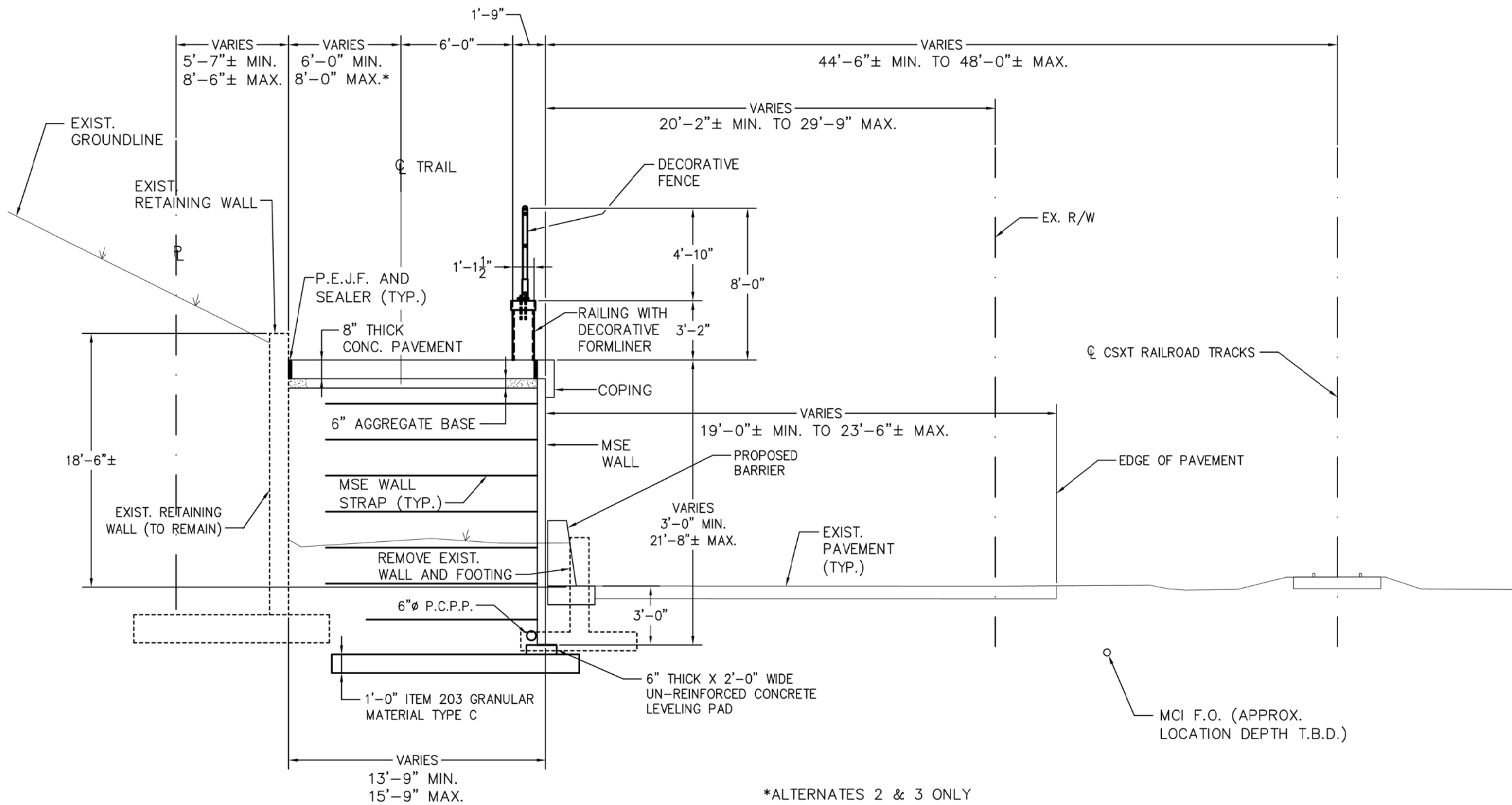
SUMMIT METRO PARKS, CITY OF AKRON,
SUMMIT COUNTY, OHIO
FREEDOM TRAIL PHASE IV
BRIDGE NO. 2 PLAN AND PROFILE

DATE
2/15/17

SCALE
None

JOB NO.
60-08322-00

SHEET
1/5



TYPICAL TRAIL SECTION A-A

*ALTERNATES 2 & 3 ONLY

ALTERNATES #1, #2 & #3

REVISIONS
MARK DATE DESCRIPTION

SUMMIT METRO PARKS

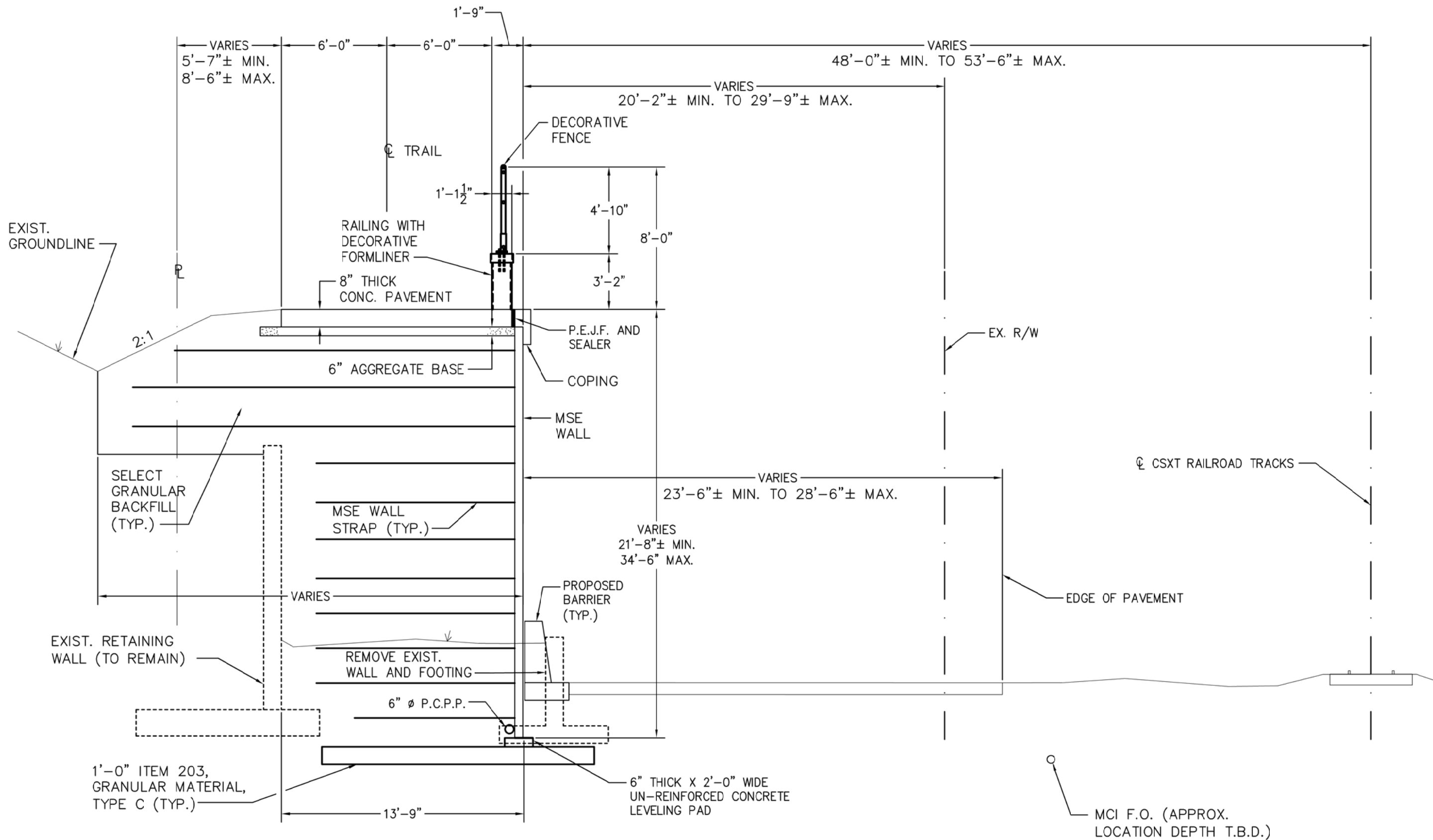
SUMMIT METRO PARKS, CITY OF AKRON
 SUMMIT COUNTY, OHIO
FREEDOM TRAIL PHASE IV
 BRIDGE NO. 2 TYPICAL TRAIL SECTION

DATE
 2/15/17

SCALE
 None

JOB NO.
 60-08322-00

SHEET
 3/5



TYPICAL TRAIL SECTION B-B

ALTERNATE #1

REVISIONS
MARK DATE DESCRIPTION

SUMMIT METRO PARKS

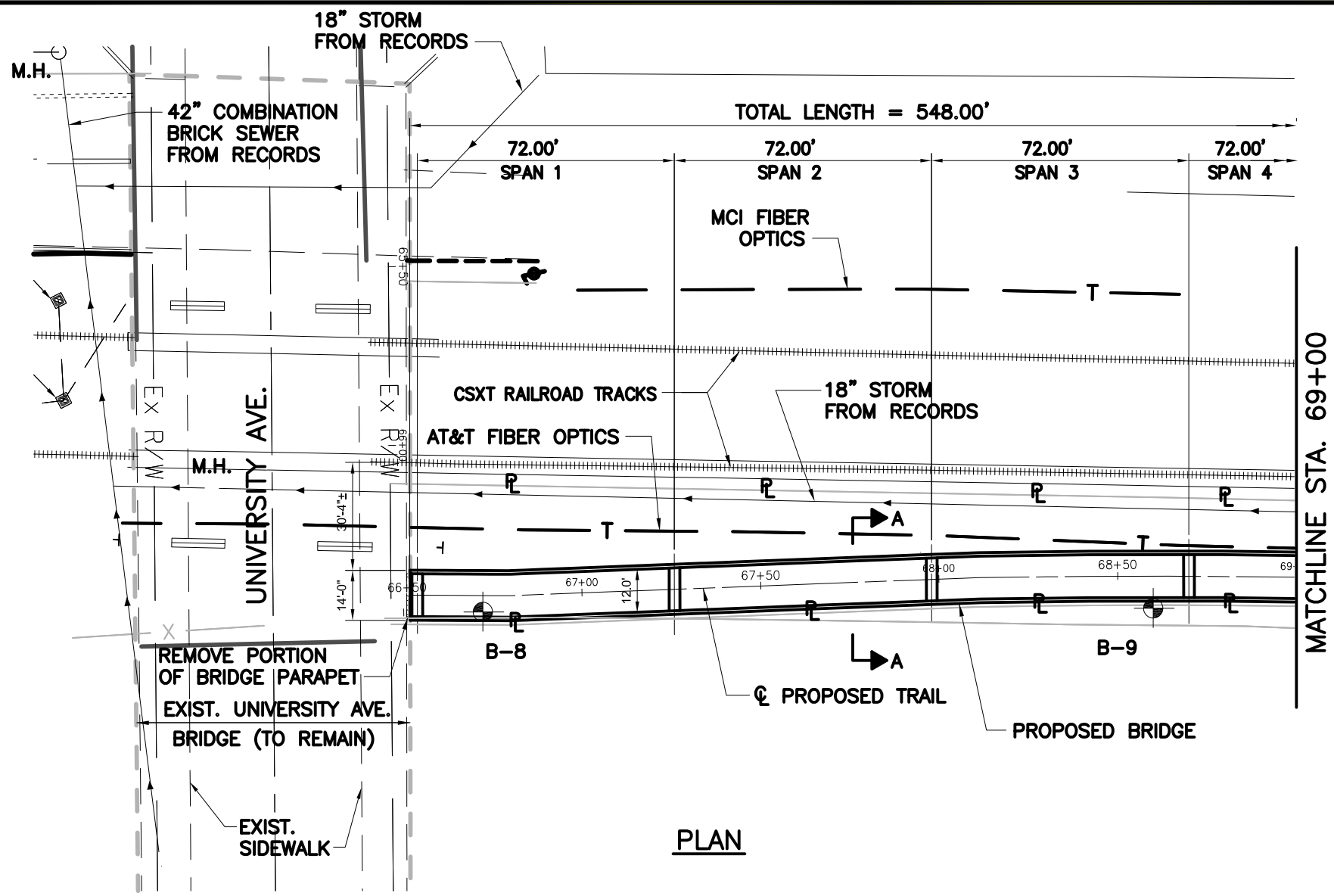
SUMMIT METRO PARKS, CITY OF AKRON
SUMMIT COUNTY, OHIO
FREEDOM TRAIL PHASE IV
BRIDGE NO. 2 TYPICAL TRAIL SECTION

DATE
2/15/17

SCALE
None


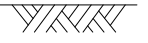
JOB NO.
60-08322-00

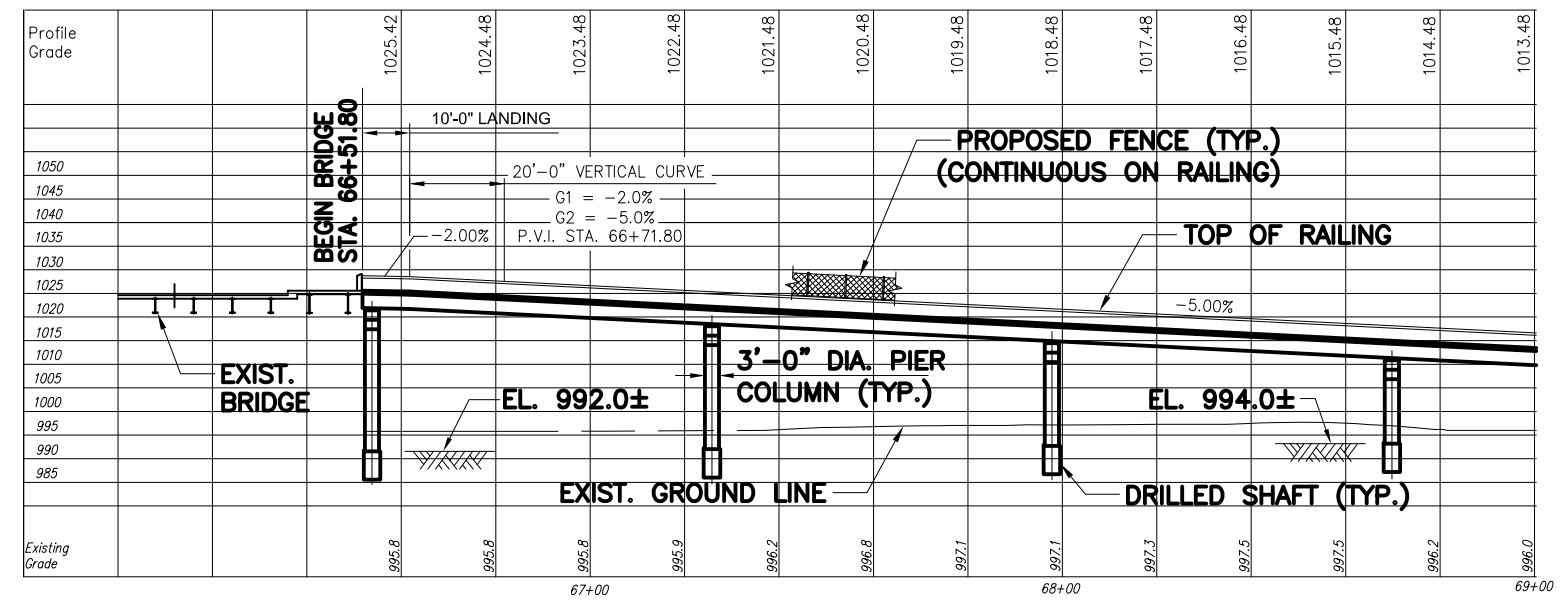
SHEET
4/5



PLAN

LEGEND:

-  BORING LOG LOCATION
-  TOP OF ROCK



PROFILE

- ALTERNATE #5 - AS SHOWN
- ALTERNATE #1 - SIMILAR 2 SPANS
- ALTERNATE #2 - SIMILAR 3 SPANS
- ALTERNATE #3 - SIMILAR 4 SPANS
- ALTERNATE #4 - SIMILAR 5 SPANS

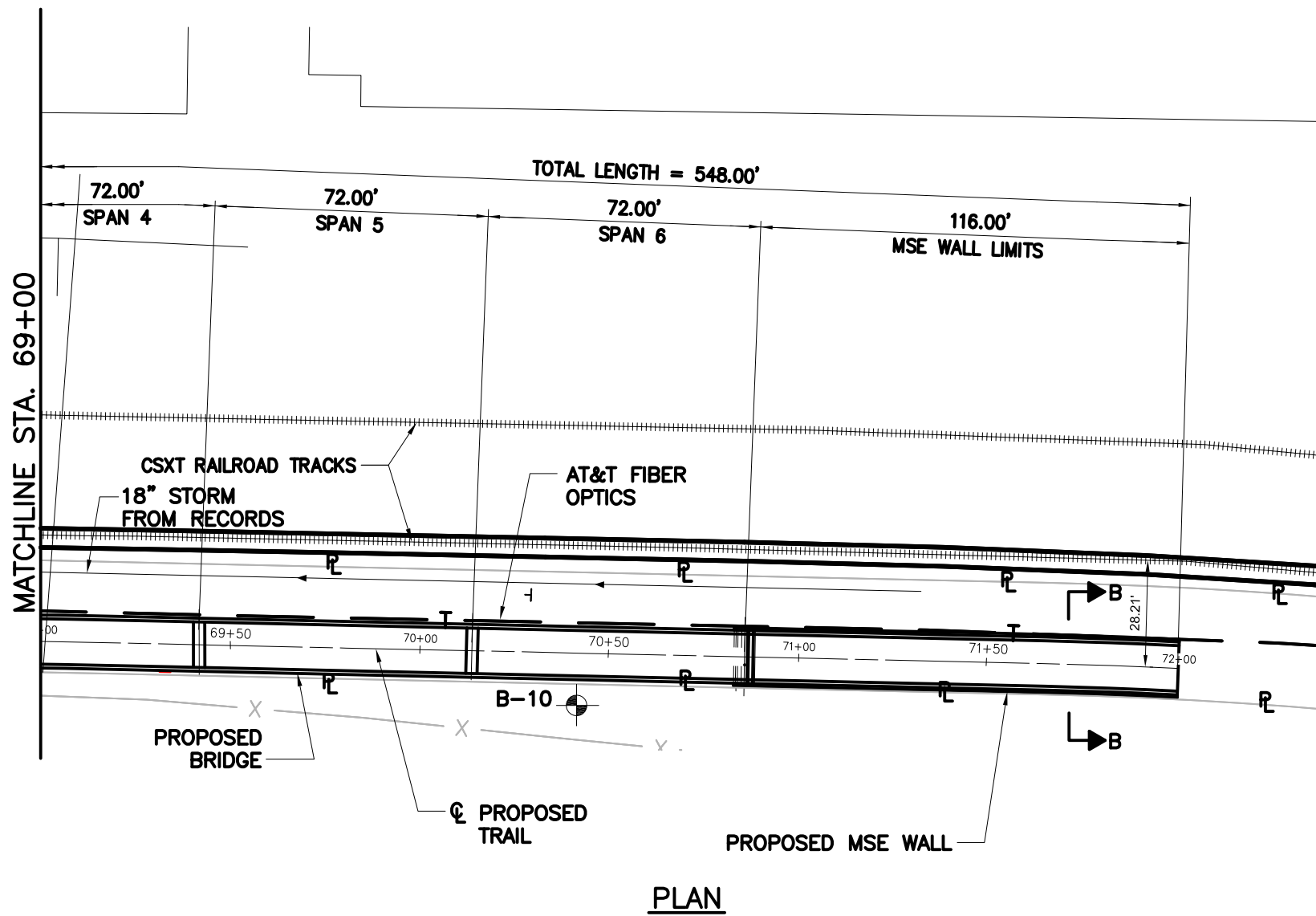
NOTES:
SEE SHEET 3/4 FOR SECTION A-A.

REVISIONS	MARK	DATE	DESCRIPTION

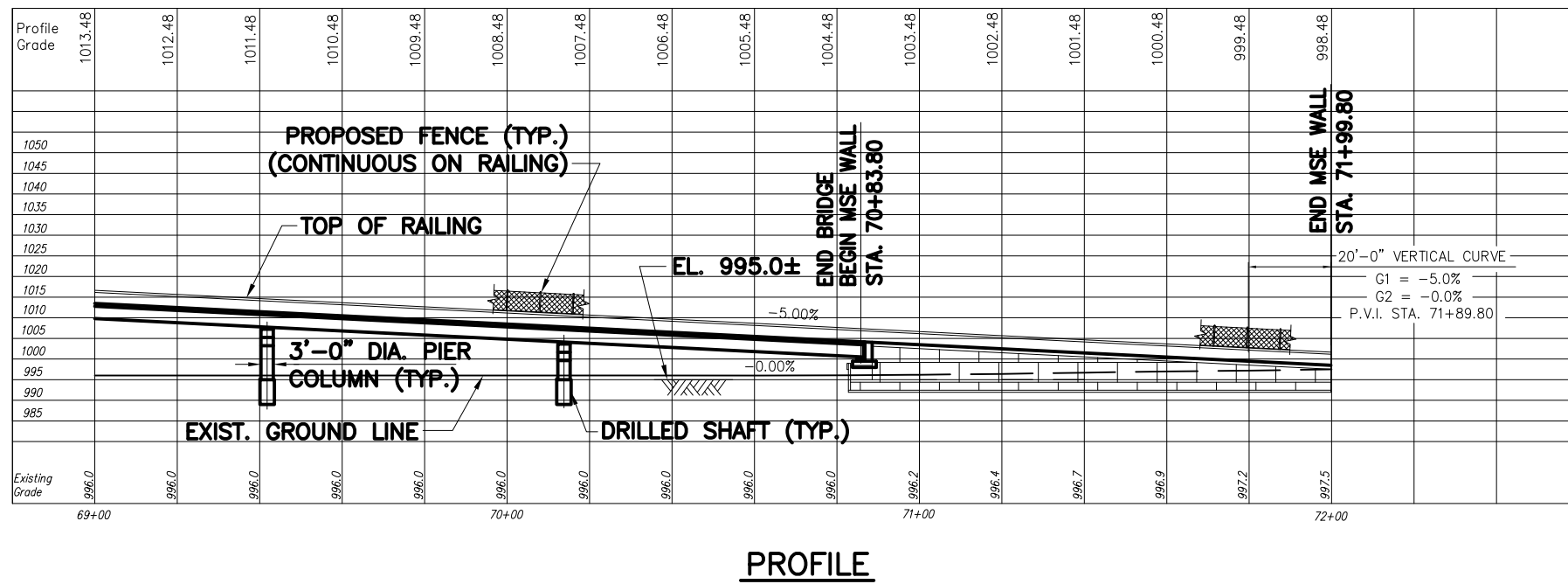
SUMMIT METRO PARKS

FREEDOM TRAIL PHASE IV
SUMMIT COUNTY, OHIO
BRIDGE NO. 3 PLAN AND PROFILE

DATE	2/15/17
SCALE	None
JOB NO.	2015045.00
SHEET	1/4



- ALTERNATE #5 - AS SHOWN
- ALTERNATE #1 - SIMILAR 2 SPANS
- ALTERNATE #2 - SIMILAR 3 SPANS
- ALTERNATE #3 - SIMILAR 4 SPANS
- ALTERNATE #4 - SIMILAR 5 SPANS



- LEGEND:**
- BORING LOG LOCATION
 - TOP OF ROCK

NOTES:

SEE SHEET 4/4 FOR SECTION B-B.

MARK	DATE	DESCRIPTION

SUMMIT METRO PARKS

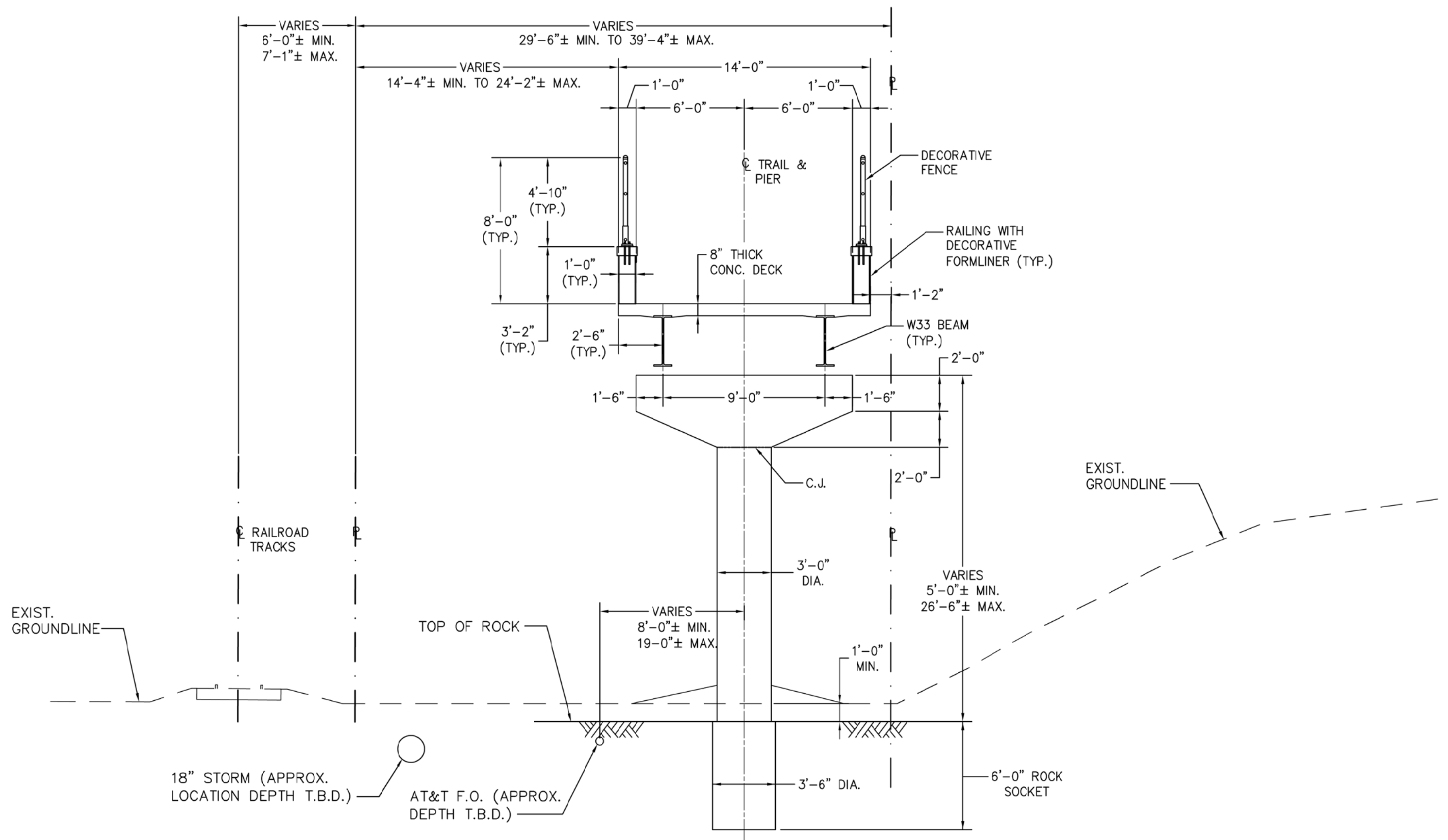
SUMMIT METRO PARKS, CITY OF AKRON
SUMMIT COUNTY, OHIO
FREEDOM TRAIL PHASE IV
BRIDGE NO. 3 PLAN AND PROFILE

DATE
2/15/17

SCALE
None

JOB NO.
2015045.00

SHEET
2/4



TYPICAL BRIDGE SECTION A-A

ALTERNATES #1 THRU #5

REVISIONS	MARK	DATE	DESCRIPTION

SUMMIT METRO PARKS

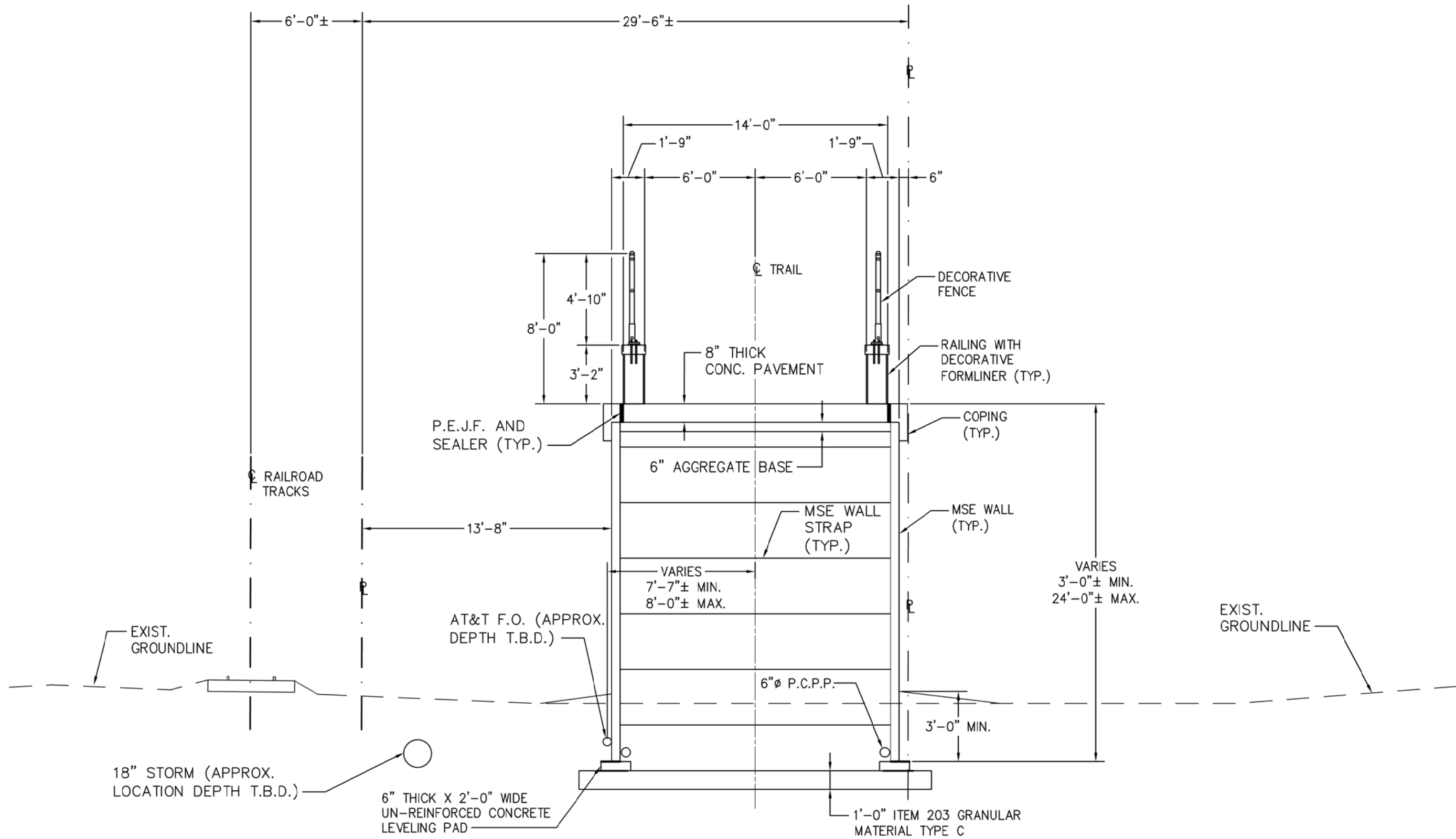
SUMMIT METRO PARKS, CITY OF AKRON
SUMMIT COUNTY, OHIO
FREEDOM TRAIL PHASE IV
BRIDGE NO. 3 TYPICAL BRIDGE SECTION

DATE
2/15/17

SCALE
None

JOB NO.
60-08322-00

SHEET
3/4



TYPICAL MSE WALL SECTION B-B

ALTERNATES #1 THRU #5

REVISIONS	MARK	DATE	DESCRIPTION

SUMMIT METRO PARKS

SUMMIT METRO PARKS, CITY OF AKRON
SUMMIT COUNTY, OHIO
FREEDOM TRAIL PHASE IV
BRIDGE NO. 3 TYPICAL MSE WALL SECTION

DATE
2/15/17

SCALE
None

JOB NO.
60-08322-00

SHEET
4/4

Appendix D

Bridge #1 Renderings







AAA
Insurance

BUSES
ONLY
BUSES
ONLY
DO NOT
ENTER



Appendix E

Utility Matrix and Correspondence

Summit Metroparks Freedom Trail Phase IV - Bridge Type Studies
Utility Conflict Matrix

Updated:

5/3/2017

By:

J. Hren, ms consultants, inc.

Company Name	Address Line 1	First Name	Last Name	Address Line 2	City	State	ZIP Code	Date Plans mailed to Utility	Facility?	Utility located near...	Conflict?	Date Review Received by ms consultants	Notes
City of Akron - Water	Distribution Division	Tony	Pugla	1460 Triplett Blvd.	Akron	Ohio	44306	1/3/2017	Bridge 2 and 3: 38" COM Bridge Sewer; 42" Concrete Sewer; 18" VCP sewer	Bridge 2 - 38" behind Wall and 42" crosses under proposed bridge: Bridge 3 - 18" runs along proposed B-3 but location not clear.	Bridge 2 may have 18" storm conflict, TBD after Akron re-reviews	1/19/2017	Will resend updated plan sheets after sewers are added, for re-review. Comments received from Jeff Kajimura.
City of Akron	Traffic Division	Dave	Gaspar	1420 Triplett Blvd., Bldg. 2	Akron	Ohio	44306	1/3/2017	no comments received			none to date	
City of Akron	Sewer Maintenance	Joe	Harbeson	1055 Home Avenue	Akron	Ohio	44310	1/3/2017	see Water above				
Ohio Edison		Dave	Miller	1910 W. Market Street, Bldg. 1	Akron	Ohio	44313	1/3/2017	no comments received			none to date	
Sprint Long Distance		Joe	Thomas	11370 Enterprise Park Drive	Sharonville	Ohio	45241	1/3/2017	no comments received			none to date	
Time Warner Cable (Charter)		Drew	Fetterman	530 S. Main Street, Suite 1751	Akron	Ohio	44331	1/3/2017	Fiber Optic	south of Rosa Parks and Broadway Intersection	No	1/10/2017	Andrew Fetterman send via Charter Communications
Zayo Fiber		Dave	Galuska	4199 Kinross Lakes Parkway, Suite 10	Richfield	Ohio	44286	1/3/2017	no comments received			none to date	
HGL Engineering	AT&T Transmission	Tony	Lyle	5980-G Wilcox Place	Dublin	Ohio	43016	1/3/2017	See notes			See notes	it is assumed that HGL is not managing ATT Transmission, and that MCG is. See below for notes.
Dominion East Ohio Gas		Bryan	Dayton	320 Springside Drive, Suite 320	Akron	Ohio	44333	1/3/2017	None		No	4/6/2017	No facilities present
Involta LLC		Tom	Lang	191 E. Miller Avenue	Akron	Ohio	44301	1/3/2017	no comments received			none to date	

Summit Metroparks Freedom Trail Phase IV - Bridge Type Studies
Utility Conflict Matrix

Updated:

5/3/2017

By:

J. Hren, ms consultants, inc.

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AT&T Ohio		Lucie	Hinshaw	50 W. Bowery Street, 6th Floor	Akron	Ohio	44308	1/3/2017	Fiber Optic	along CSXT tracks, but not within bridge limits	No	1/23/2017	contact name chaged per email received. FO added to plans based on drawings
									Fiber Optic	Additional email communication with Lucie on 2/21/17 indicates that the FO line may be in conflict with Bridge #3. ATT Ohio to send additional information when it is available.	Likely	TBD	Waiting on additional information, including OUPS information and easement information from ATT Ohio.
									Fiber Optic	Bridge 3	Yes	4/6/2017	FO was surveyed . Conflict confirmed. The piers were changes from spread footings to drilled shafts to minimize conflict. The approach MSE wall still has some conflict. Costs included for relcation of FO at approach walls. No easement costs.
Verizon (MCI)		Al	Guest	120 Ravine Street	Akron	Ohio	44303	1/3/2017	Fiber Optic	in pavement, along service road in front of Bridge 2	No	1/12/2017	Company is MCI. FO added to plans based on drawings
Century Link		Chris	Strayer	441 W. Broad Street	Pataskala	Ohio	43062	1/3/2017	no comments received			none to date	
XO Communications		Dale	Ferguson	6900 Southpointe Parkway	Brecksville	Ohio	44141	1/3/2017	no comments received			none to date	
Akron Energy Systems LLC		David	Hoffman	226 Opportunity Parkway	Akron	Ohio	44307	1/3/2017	no comments received			none to date	

Summit Metroparks Freedom Trail Phase IV - Bridge Type Studies
Utility Conflict Matrix

Updated:

5/3/2017

By:

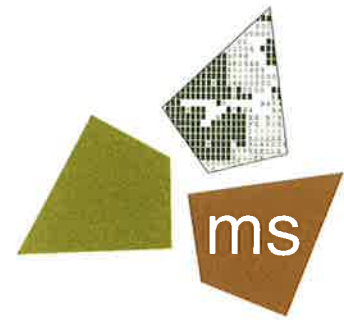
J. Hren, ms consultants, inc.

Company Name	Address Line 1	First Name	Last Name	Address Line 2	City	State	ZIP Code	Date Plans mailed to Utility	Facility?	Utility located near...	Conflict?	Date Review Received by ms consultants	Notes
University of Akron	Capital Planning & Facilities Management	Janis	McCracken	Lincoln Building, Third Floor	Akron	Ohio	44325-0405	1/3/2017	no comments received			none to date	
University of Akron	Capital Planning & Facilities Management	Stephen	Myers	Lincoln Building, Third Floor	Akron	Ohio	44325-0405	1/3/2017	no comments received			none to date	
Metropolitan Communications Group, Ohio	AT&T Transmission	Bill	Harkness	155 Commerce Park Drive, Suite 1	Westerville	Ohio	43082	1/3/2017	Fiber Optic	Bridge 1, Rear approach at Shipper lot, and Forward approach embankment and path	Relocation at Forward Abutment possible.	Site visit with Chad Harkness on 1/17/17. MCG marked and surveyed line.	Data File received on 1/27/17. FO conflict may exist at western approach fill. Contingency costs included for protection.
Everflow Eastern Partners, LP	Strawn Oilfield Services	George	Strawn	29093 S.R. 62	Salem	Ohio	44460	1/18/2017	2" gas	Bridge 1 forward abutment	Yes, relocation or protection possible.	1/30/2017	Contingency costs included for protection or relocation.

**Preliminary Bridge Type Study
Utility Transmittal Letters**

ms consultants, inc.
engineers, architects, planners

One Cascade Plaza, Suite 140
Akron, Ohio 44308-1136
p 330.258.9920
f 330.258.9921
www.msconsultants.com



January 3, 2017

City of Akron - Water
Distribution Division
1460 Triplett Blvd.
Akron, Ohio 44306

Attn: Mr. Tony Pugla

**RE: Preliminary Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio
Utility and Stakeholder Reviews**

Dear Mr. Pugla:

ms consultants, inc. is under contract with the Summit Metro Parks to provide Preliminary Bridge Type Study Plans for three (3) new structures for the proposed Freedom Trail Phase IV, located in the City of Akron. The attached plans show the location of these proposed bridges. Also included are site plans and typical details for each location. The locations are summarized as follows:

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Mr. Tony Pugla
January 3, 2017
Page 2

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Kind regards,

A handwritten signature in black ink, appearing to read 'JDH', with a long horizontal stroke extending to the right.

Jonathan D. Hren, PE
Project Manager

JDH:amg
Enclosure

cc: Charles Hauber (Summit Metro Parks)
Nick Moskos (Summit Metro Parks)
Renee Whittenberger (EDG)

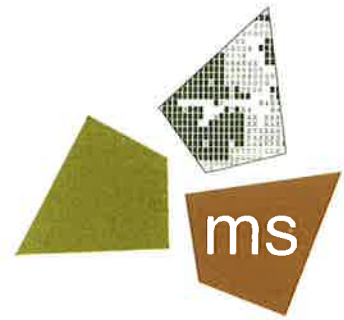
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January 3, 2017

City of Akron
Traffic Division
1420 Triplett Blvd., Bldg. 2
Akron, Ohio 44306

Attn: Mr. Dave Gasper

**RE: Preliminary Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio
Utility and Stakeholder Reviews**

Dear Mr. Gasper:

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January 3, 2017
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Project Manager

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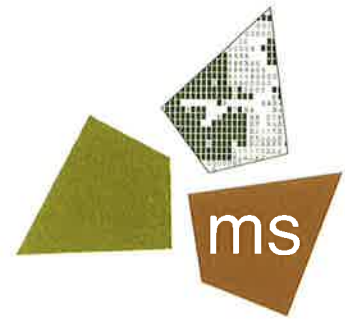
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January 3, 2017

City of Akron
Sewer Maintenance
1055 Home Avenue
Akron, Ohio 44310

Attn: Mr. Joe Harbeson

**RE: Preliminary Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio
Utility and Stakeholder Reviews**

Dear Mr. Harbeson:

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Mr. Joe Harbeson
January 3, 2017
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Jonathan D. Hren, PE
Project Manager

JDH:amg
Enclosure

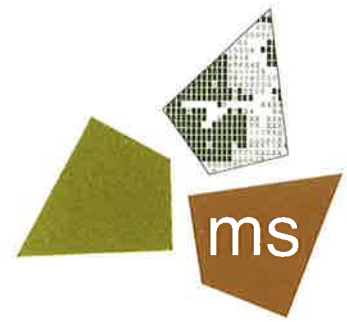
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January 3, 2017

Ohio Edison
1910 W. Market Street, Bldg. 1
Akron, Ohio 44313

Attn: Mr. Dave Miller

**RE: Preliminary Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio
Utility and Stakeholder Reviews**

Dear Mr. Miller:

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Mr. Dave Miller
January 3, 2017
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Project Manager

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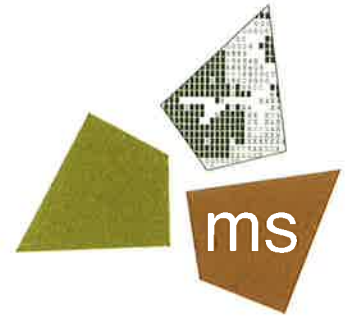
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January 3, 2017

Sprint Long Distance
11370 Enterprise Park Drive
Sharonville, Ohio 45241

Attn: Mr. Joe Thomas

**RE: Preliminary Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio
Utility and Stakeholder Reviews**

Dear Mr. Thomas:

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Mr. Joe Thomas
January 3, 2017
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Project Manager

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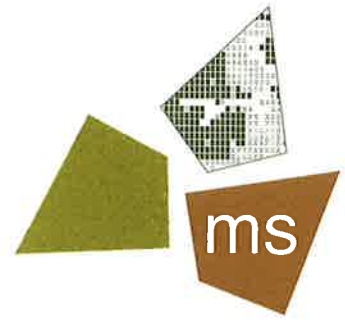
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January 3, 2017

Time Warner Cable
530 S. Main Street, Suite 1751
Akron, Ohio 44331

Attn: Mr. Drew Fetterman

**RE: Preliminary Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio
Utility and Stakeholder Reviews**

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Mr. Drew Fetterman
January 3, 2017
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Jonathan D. Hren, PE
Project Manager

JDH:amg

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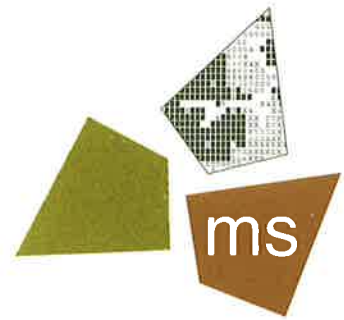
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f 330.258.9921
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January 3, 2017

Zayo Fiber
4199 Kinross Lakes Parkway, Suite 10
Richfield, Ohio 44286

Attn: Mr. Dave Galuska

**RE: Preliminary Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio
Utility and Stakeholder Reviews**

Dear Mr. Galuska:

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Mr. Dave Galuska
January 3, 2017
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Jonathan D. Hren, PE
Project Manager

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Nick Moskos (Summit Metro Parks)
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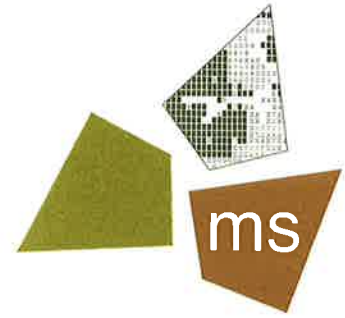
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engineers, architects, planners

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January 3, 2017

HGL Engineering
AT&T Transmission
5980-G Wilcox Place
Dublin, Ohio 43016

Attn: Mr. Tony Lyle

**RE: Preliminary Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio
Utility and Stakeholder Reviews**

Dear Mr. Lyle:

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Mr. Tony Lyle
January 3, 2017
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Jonathan D. Hren, PE
Project Manager

JDH:amg
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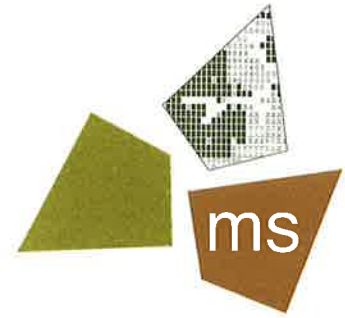
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engineers, architects, planners

One Cascade Plaza, Suite 140
Akron, Ohio 44308-1136
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f 330.258.9921
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January 3, 2017

Dominion East Ohio Gas
320 Springside Drive, Suite 320
Akron, Ohio 44333

Attn: Mr. Bryan Dayton

**RE: Preliminary Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio
Utility and Stakeholder Reviews**

Dear Mr. Dayton:

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Mr. Bryan Dayton
January 3, 2017
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Jonathan D. Hren, PE
Project Manager

JDH:amg

Enclosure

cc: Charles Hauber (Summit Metro Parks)
Nick Moskos (Summit Metro Parks)
Renee Whittenberger (EDG)

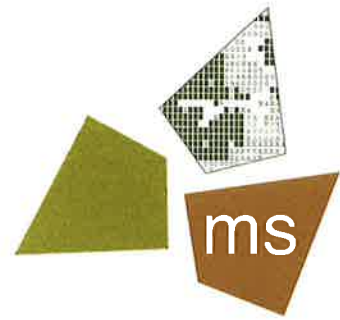
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bts transmittal letter.docx

ms consultants, inc.

engineers, architects, planners

One Cascade Plaza, Suite 140
Akron, Ohio 44308-1136
p 330.258.9920
f 330.258.9921
www.msconsultants.com



January 3, 2017

Involta LLC
191 E. Miller Avenue
Akron, Ohio 44301

Attn: Mr. Tom Lang

**RE: Preliminary Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio
Utility and Stakeholder Reviews**

Dear Mr. Lang:

ms consultants, inc. is under contract with the Summit Metro Parks to provide Preliminary Bridge Type Study Plans for three (3) new structures for the proposed Freedom Trail Phase IV, located in the City of Akron. The attached plans show the location of these proposed bridges. Also included are site plans and typical details for each location. The locations are summarized as follows:

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Mr. Tom Lang
January 3, 2017
Page 2

Kind regards,

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Jonathan D. Hren, PE
Project Manager

JDH:amg
Enclosure

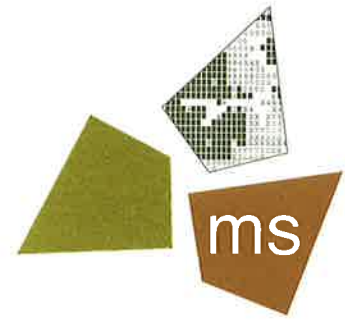
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January 3, 2017

AT&T Ohio
50 W. Bowery Street, 6th Floor
Akron, Ohio 44308

Attn: Mr. Rich Wilson

**RE: Preliminary Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio
Utility and Stakeholder Reviews**

Dear Mr. Wilson:

ms consultants, inc. is under contract with the Summit Metro Parks to provide Preliminary Bridge Type Study Plans for three (3) new structures for the proposed Freedom Trail Phase IV, located in the City of Akron. The attached plans show the location of these proposed bridges. Also included are site plans and typical details for each location. The locations are summarized as follows:

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Mr. Rich Wilson
January 3, 2017
Page 2

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Jonathan D. Hren, PE
Project Manager

JDH:amg

Enclosure

cc: Charles Hauber (Summit Metro Parks)
Nick Moskos (Summit Metro Parks)
Renee Whittenberger (EDG)

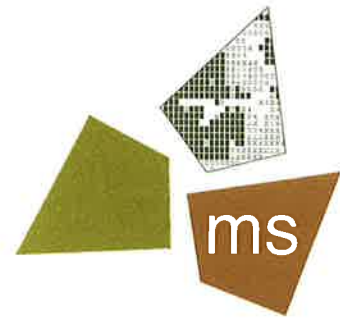
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January 3, 2017

Verizon (MCI)
120 Ravine Street
Akron, Ohio 44303

Attn: Mr. Al Guest

**RE: Preliminary Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio
Utility and Stakeholder Reviews**

Dear Mr. Guest:

ms consultants, inc. is under contract with the Summit Metro Parks to provide Preliminary Bridge Type Study Plans for three (3) new structures for the proposed Freedom Trail Phase IV, located in the City of Akron. The attached plans show the location of these proposed bridges. Also included are site plans and typical details for each location. The locations are summarized as follows:

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Mr. Al Guest
January 3, 2017
Page 2

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Jonathan D. Hren, PE
Project Manager

JDH:amg
Enclosure

cc: Charles Hauber (Summit Metro Parks)
Nick Moskos (Summit Metro Parks)
Renee Whittenberger (EDG)

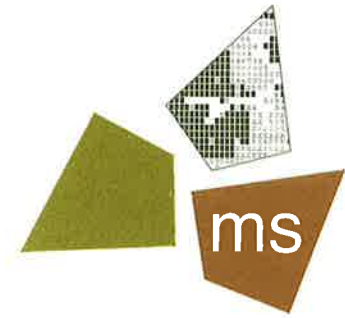
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January 3, 2017

Century Link
441 W. Broad Street
Pataskala, Ohio 43062

Attn: Mr. Chris Strayer

**RE: Preliminary Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio
Utility and Stakeholder Reviews**

Dear Mr. Strayer:

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Mr. Chris Strayer
January 3, 2017
Page 2

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Jonathan D. Hren, PE
Project Manager

JDH:amg
Enclosure

cc: Charles Hauber (Summit Metro Parks)
Nick Moskos (Summit Metro Parks)
Renee Whittenberger (EDG)

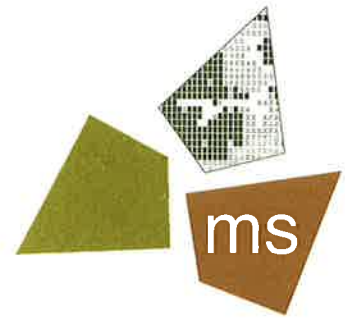
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f 330.258.9921
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January 3, 2017

XO Communications
6900 Southpointe Parkway
Brecksville, Ohio 44141

Attn: Mr. Dale Ferguson

**RE: Preliminary Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio
Utility and Stakeholder Reviews**

Dear Mr. Ferguson:

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Mr. Dale Ferguson
January 3, 2017
Page 2

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Jonathan D. Hren, PE
Project Manager

JDH:amg

Enclosure

cc: Charles Hauber (Summit Metro Parks)
Nick Moskos (Summit Metro Parks)
Renee Whittenberger (EDG)

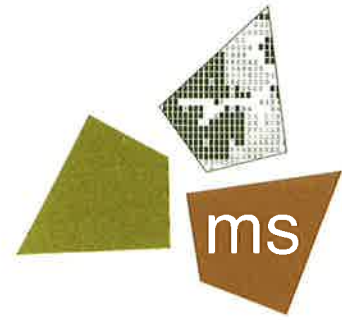
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f 330.258.9921
www.msconsultants.com



January 3, 2017

Akron Energy Systems LLC
226 Opportunity Parkway
Akron, Ohio 44307

Attn: Mr. David Hoffman

**RE: Preliminary Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio
Utility and Stakeholder Reviews**

Dear Mr. Hoffman:

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Mr. David Hoffman
January 3, 2017
Page 2

Kind regards,

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Jonathan D. Hren, PE
Project Manager

JDH:amg

Enclosure

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Nick Moskos (Summit Metro Parks)
Renee Whittenberger (EDG)

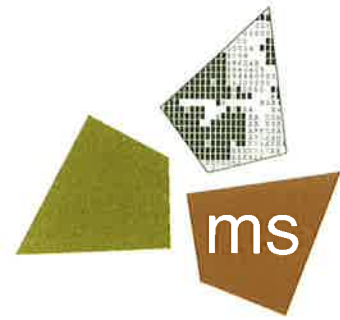
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engineers, architects, planners

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Akron, Ohio 44308-1136
p 330.258.9920
f 330.258.9921
www.msconsultants.com



January 3, 2017

University of Akron
Capital Planning & Facilities Management
Lincoln Building, Third Floor
Akron, Ohio 44325-0405

Attn: Ms. Janis McCracken

**RE: Preliminary Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio
Utility and Stakeholder Reviews**

Dear Ms. McCracken:

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Ms. Janis McCracken
January 3, 2017
Page 2

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Jonathan D. Hren, PE
Project Manager

JDH:amg
Enclosure

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Nick Moskos (Summit Metro Parks)
Renee Whittenberger (EDG)

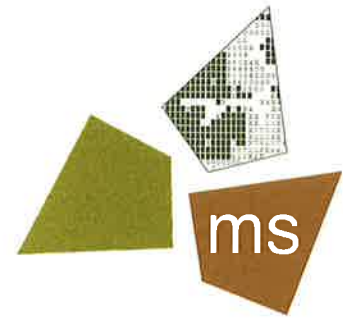
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January 3, 2017

University of Akron
Capital Planning & Facilities Management
Lincoln Building, Third Floor
Akron, Ohio 44325-0405

Attn: Mr. Stephen Myers

**RE: Preliminary Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio
Utility and Stakeholder Reviews**

Dear Mr. Myers:

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January 3, 2017
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Jonathan D. Hren, PE
Project Manager

JDH:amg

Enclosure

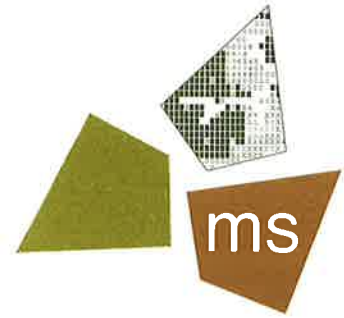
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engineers, architects, planners

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f 330.258.9921
www.msconsultants.com



January 3, 2017

Metropolitan Communications Group, Ohio
155 Commerve Park Drive, Suite 1
Westerville, Ohio 43082

Attn: Mr. Bill Harkness

**RE: Preliminary Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio
Utility and Stakeholder Reviews**

Dear Mr. Harkness:

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Mr. Bill Harkness
January 3, 2017
Page 2

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Jonathan D. Hren, PE
Project Manager

JDH:amg

Enclosure

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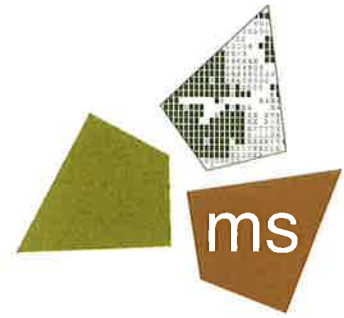
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engineers, architects, planners

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Akron, Ohio 44308-1136
p 330.258.9920
f 330.258.9921
www.msconsultants.com



January 18, 2017

Everflow Eastern Partners, LP
29093 State Route 62
Salem, Ohio 44460

Attn: George Stawn

**RE: Preliminary Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio
Utility and Stakeholder Reviews**

Dear Mr. Stawn,

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Jonathan D. Hren, PE
Project Manager

JDH:amg

Enclosure

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Nick Moskos (Summit Metro Parks)
Renee Whittenberger (EDG)

File: 60-08322-00

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Preliminary Bridge Type Study Utility Responses

Hren, Jonathan

From: allan.guest@verizon.com
Sent: Thursday, January 12, 2017 1:53 PM
To: Hren, Jonathan
Subject: Freedom Trail Phase IV - Akron OH
Attachments: Freedom Trail MCI Locations 001.pdf

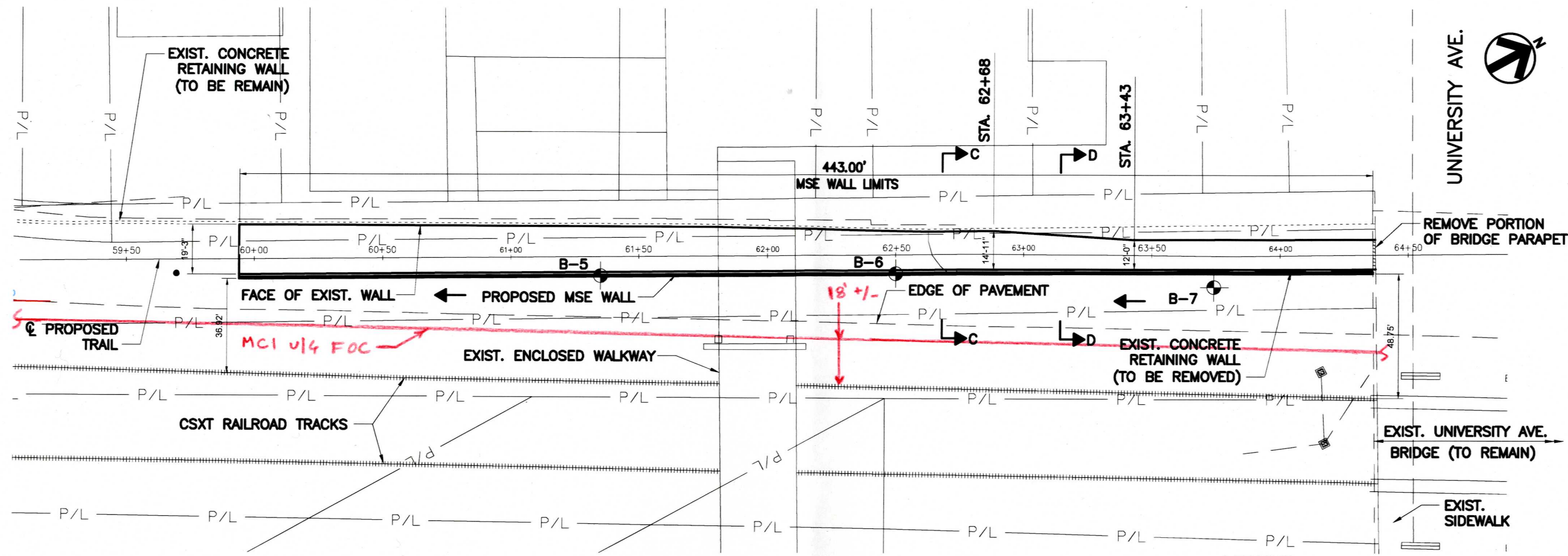
Mr. Hren,
MCI/Verizon is in receipt of the drawings you sent us for the subject project.
Please find attached plan sheet #'s 1/3 and 1/4 on which we have indicated the location of the MCI/Verizon fiber optic cable.
Please let us know if you need any additional information.
Regards,



Al Guest
OSP Engineer
Great Lakes Transport Engineering & Implementation

120 Ravine St.
Akron OH 44303

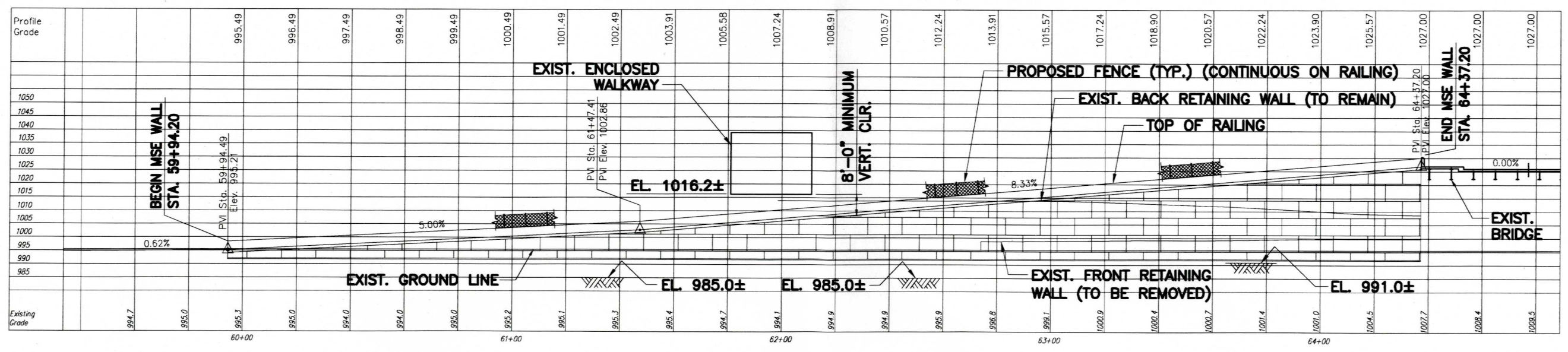
O 330-253-8267 | M 330-329-5495
allan.guest@verizon.com



PLAN

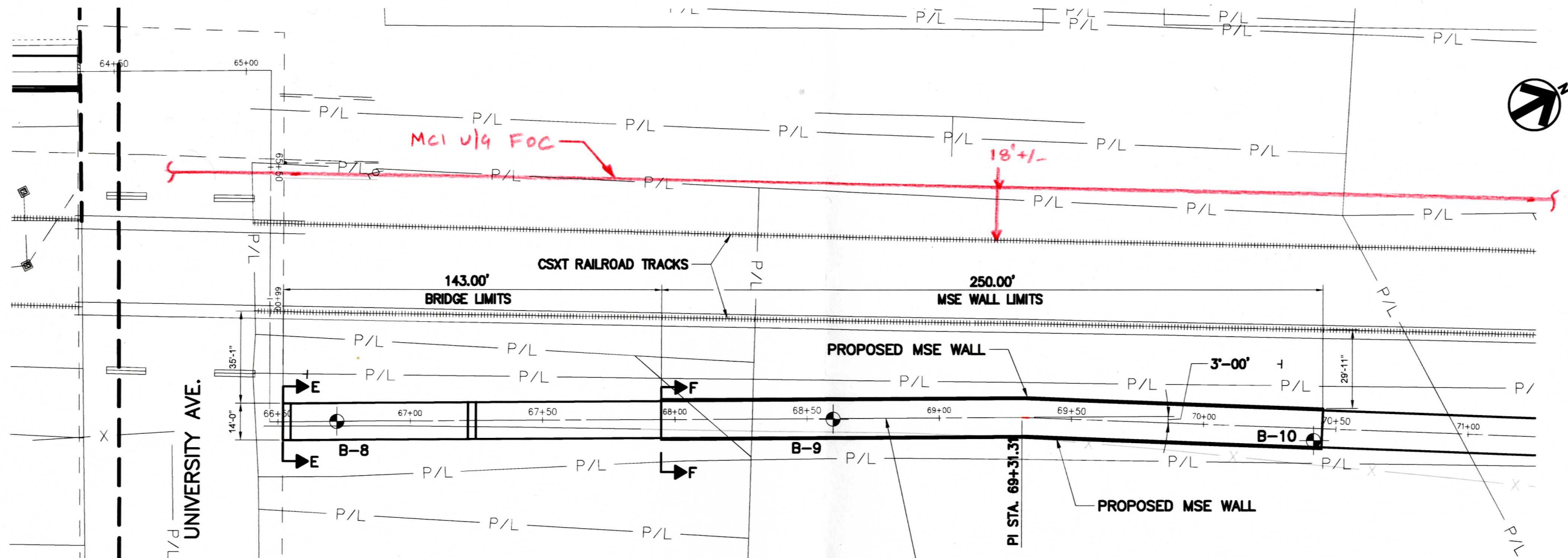
ALTERNATE #1

LEGEND:
 BORING LOG LOCATION
 TOP OF ROCK



PROFILE

REVISIONS	MARK	DATE	DESCRIPTION
SUMMIT METRO PARKS			
FREEDOM TRAIL PHASE IV BRIDGE NO. 2 PLAN AND PROFILE			
SUMMIT METRO PARKS, CITY OF AKRON, SUMMIT COUNTY, OHIO			
DATE	11/29/16		
SCALE	None		
JOB NO.	60-08322-00		
SHEET	1/4		

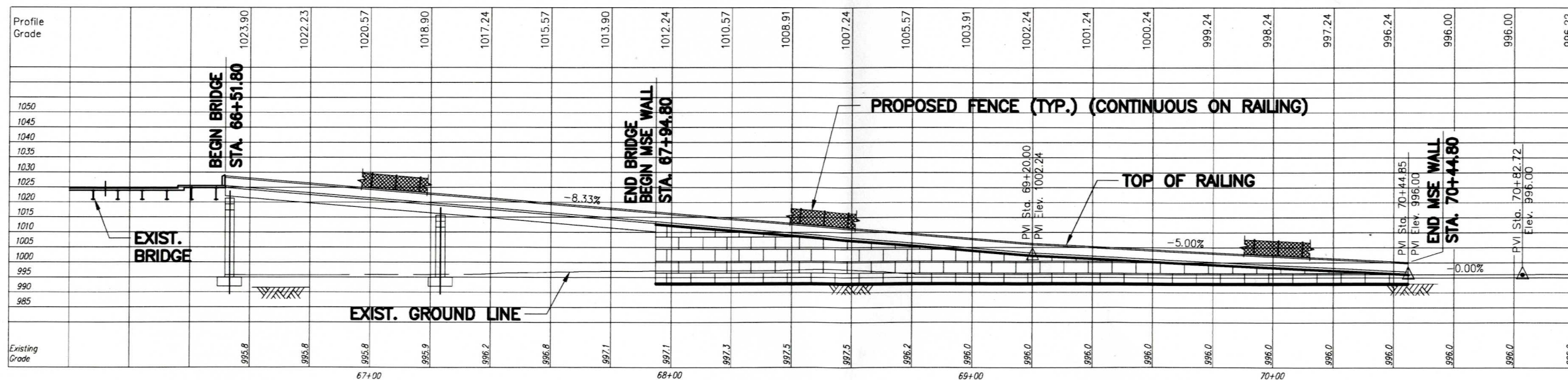


PLAN

ALTERNATE #1

LEGEND:

- BORING LOG LOCATION
- TOP OF ROCK



PROFILE

REVISIONS	
MAKE DATE DESCRIPTION	

SUMMIT METRO PARKS

SUMMIT METRO PARKS, CITY OF AKRON
SUMMIT COUNTY, OHIO
FREEDOM TRAIL PHASE IV
BRIDGE NO. 3 PLAN AND PROFILE

DATE
11/29/16

SCALE
None

JOB NO.
2015045.00

SHEET
1/3



DANIEL HARRIGAN, MAYOR

DEPARTMENT OF PUBLIC SERVICE

AKRON ENGINEERING BUREAU

166 SOUTH HIGH STREET, ROOM 701

AKRON, OHIO 44308-1627

Phone: (330) 375-2355, Fax: (330) 375-2288

E-mail: AkronEngineering@akronohio.gov



JAMES ANDREW HEWITT, P.E.
CITY ENGINEER

January 12, 2017

RECEIVED

JAN 19 2017

ms consultants, inc.
AKRON, OHIO

Jonathan D. Hren, P.E.
ms consultants, inc.
One Cascade Plaza, Suite 140
Akron, OH 44308

**Re: Preliminary Bridge Type Study
Freedom Trail Phase IV, Akron, Ohio**

Dear Mr. Hren:

The bridge plans for the subject trail improvement project have been reviewed by our staff for the Akron Bureau of Water Supply and the comments are listed as follows:

1. Sheet 1 of 4, Plan and Profile - south of University Ave.: Existing sewers are not shown. Existing manholes may have to be adjusted to proposed finish grades. Please review and show existing sewers.
2. Sheet 4 of 4, Plan and Profile - south of University Ave.: Where is this Typical Bridge Section located? South of University Ave. does not appear to have bridge sections. Bridge sections to the north of University Ave. indicate using Typical Section E-E, Sheet 2 of 3. Please clarify.

If you have any questions, please contact me at 330-375-2369 or jkajimura@akronohio.gov.

Sincerely,

Jeff Kajimura
Engineering Technician

JK/mm

c: J. Bronowski, S. Needham, G. Loesch, J. Okolish, B. Gresser, R. Scarletelli, S. Davenport, J. Harbeson, G. Hanna, G. Thomas, C. Hauber - Metro Parks, Environmental File

Dominion East Ohio
320 Springside Drive, Suite 320, Akron, OH 44333



April 03, 2017

Jonathan Hren
MS Consultants
One Cascade Plaza
Suite 140
Akron, OH 44308

Project: Freedom Trail Phase 4-892117

Dear Jonathan Hren,

After a review of the plans for the above referenced project as provided by your office on 1/6/2017, it appears that Dominion East Ohio (DEO) does not have any facilities in conflict with the proposed project. If during the course of construction, there is any perceived issue, conflict, or problem with a gas mainline related to the project, the authorized agent for the project should notify DEO immediately by contacting the designer listed below or by email to relocation@dom.com. DEO will always attempt to work with the authorized agent for the project and the contractor to resolve conflicts and prevent delays.

As required by statute, DEO acknowledges its pipelines, as a rule, were installed at approximately 36 inches deep. At concerned points where you need to know the location and elevation of DEO's pipeline, you may excavate by hand digging to temporarily expose the pipeline enabling you to obtain the necessary information. Contact the Ohio Protection Service (OUPS) (1-800-362-2764) prior to your excavation or hand digging and submit an excavation ticket. In addition to hand digging, you may use non-destructive pipeline location methods, such as those performed by companies like So-Deep or TBE.

Dominion requests that the following note be added to your plans for the benefit of your contractor:

'It is the contractor's responsibility to maintain the lateral and subjacent support of Dominion's pipeline(s), in compliance to 29 CFR, Part 1926, subpart P, (safe excavation & shoring). One-foot minimum vertical and horizontal clearance must be maintained between Dominion East Ohio's (DEO) existing pipeline(s) and all other improvements. Extreme care should be taken not to harm any DEO facility (pipelines, etc.) or appurtenance (pipe coating, tracer wire, cathodic protection test station wires & devices, valve boxes, etc.). DEO facilities must be protected with a tarp during bridge construction. The contractor will be responsible and liable for ensuring that all DEO existing facilities, above and below ground, remain undamaged, accessible and in working order. The crossing of DEO's pipeline with another steel facility may create a potential corrosion issue for the proposed facility and the existing DEO facility. Please contact Dominion's Corrosion Department: Dave Cutlip (330-266-2121), Rick McDonald (330-266-2122), or Al Humrichouser (330-478-3757).'

Since over 1000 gas companies now operate in Ohio, proper pipeline identification is necessary to assure minimum critical response time. We request that you add the following general note to your construction plans: 'DEO = The East Ohio Gas Company, dba Dominion East Ohio, 1-800-362-7557. Dominion's facilities should be identified appropriately on your construction plans.'

DEO's response is based on the project information you or others provided for this project. The location of DEO facilities within the project area are based on the records of the original installation, and are therefore approximate, and not guaranteed. DEO has no knowledge or information of changes that may have been made to the site after the original installation. Any reliance on the information provided is solely at the risk of the user, who agrees to indemnify, defend and hold DEO, its owners, officers, affiliates and subsidiaries harmless, to the fullest extent permitted by law, from and against any and all loss, claims, demands, damages, injuries or suits in anyway arising out of or incident to its use.

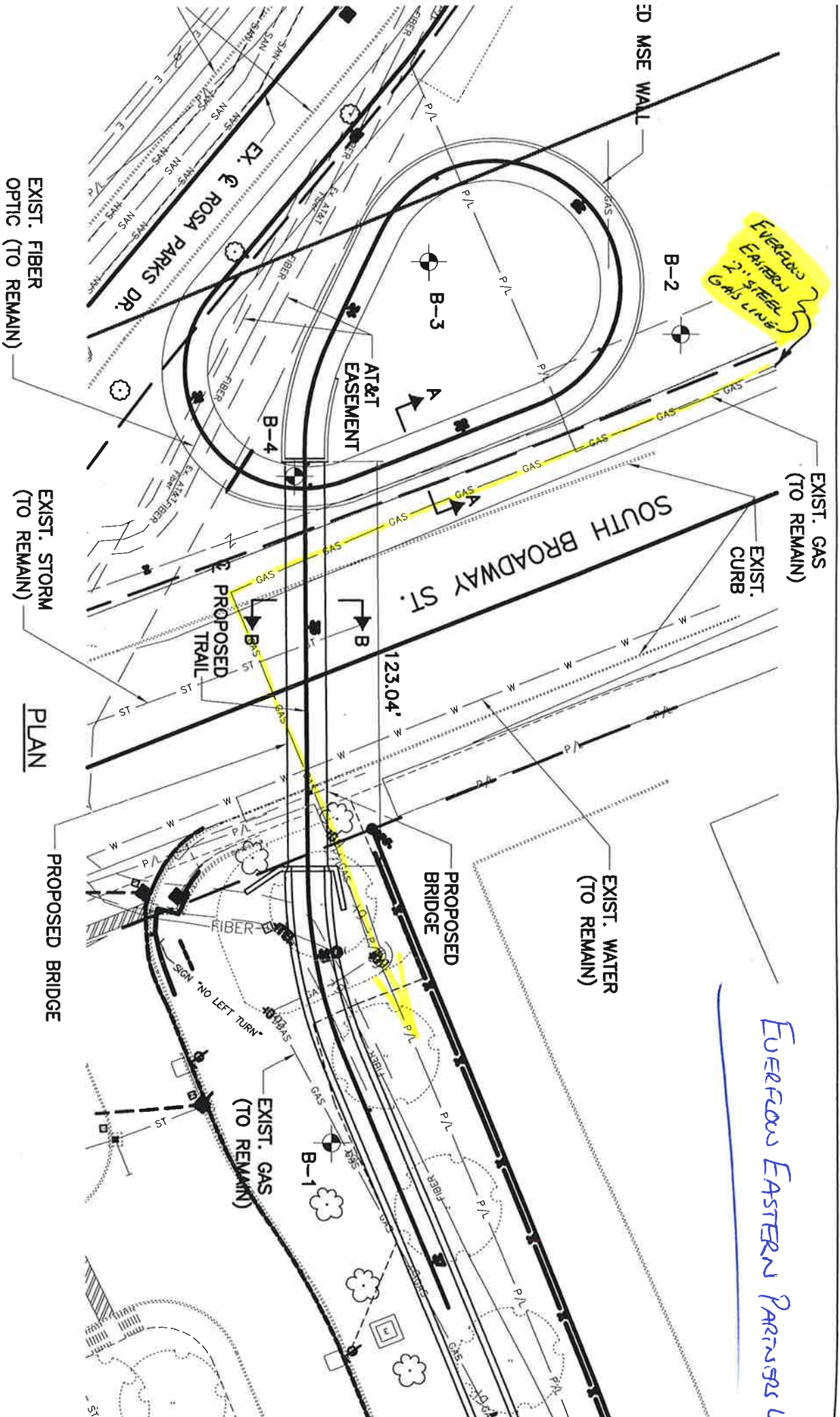
DEO will not be liable for nor accept any contractor delay costs that the company has not had an opportunity to review, dispute and/or resolve.

Please maintain communication with this office regarding the project and its schedule. Contact me if you have any questions.



Bryan Dayton
Dominion East Ohio
Email: bryan.d.dayton@dom.com
Phone: 330-664-2409





EVERFLOW EASTERN 2" STEEL GAS LINE

EVERFLOW EASTERN PARKWAYS

EXIST. FIBER OPTIC (TO REMAIN)

EXIST. STORM (TO REMAIN)

PLAN

PROPOSED BRIDGE

EXIST. GAS (TO REMAIN)

EXIST. WATER (TO REMAIN)

EXIST. GAS (TO REMAIN)

EXIST. CURB

SOUTH BROADWAY ST.

EX. ROSA PARKS DR.

AT&T EASEMENT

ED MSE WALL

123.04'

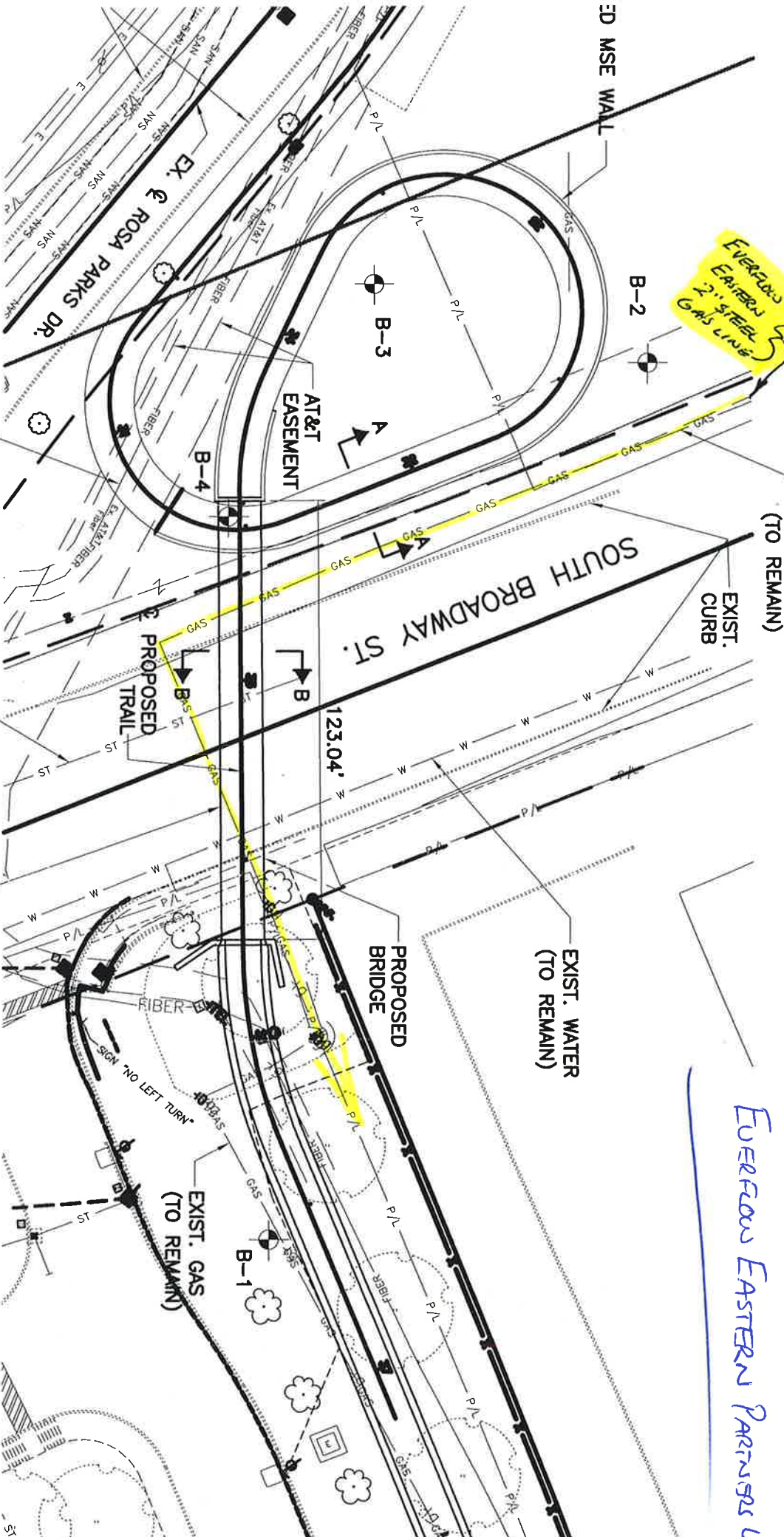
PROPOSED TRAIL

PROPOSED BRIDGE

FIBER

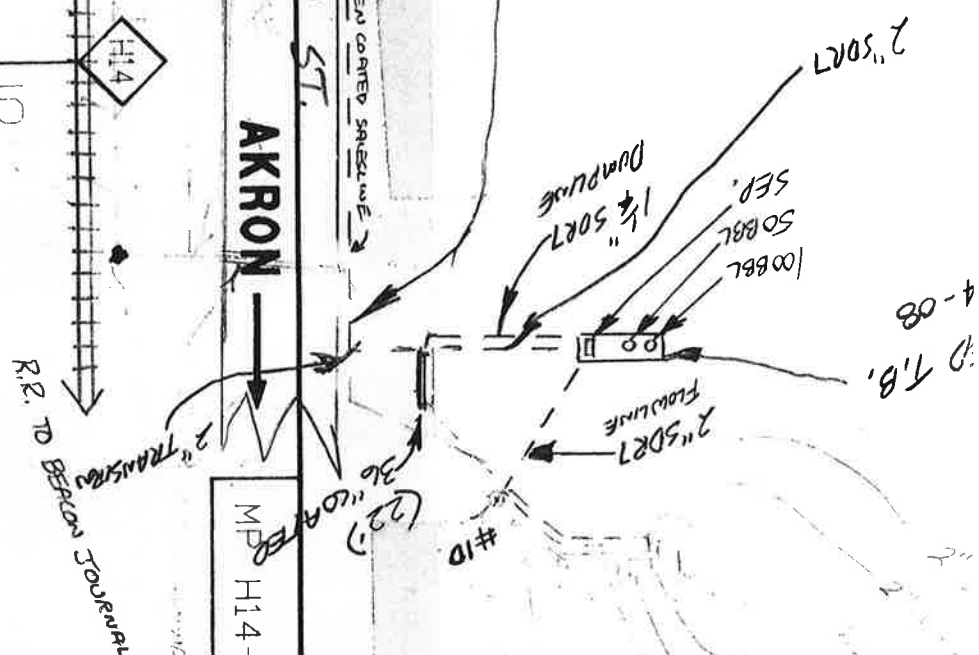
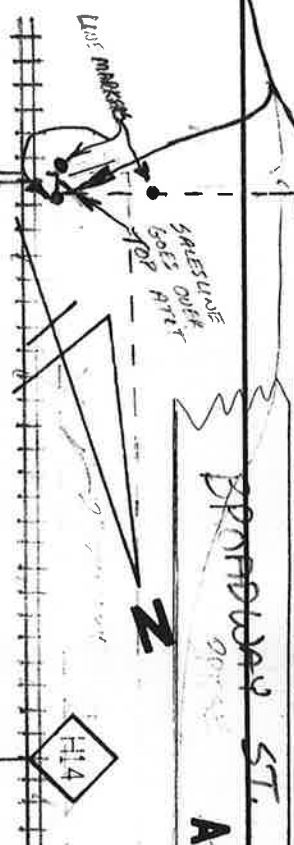
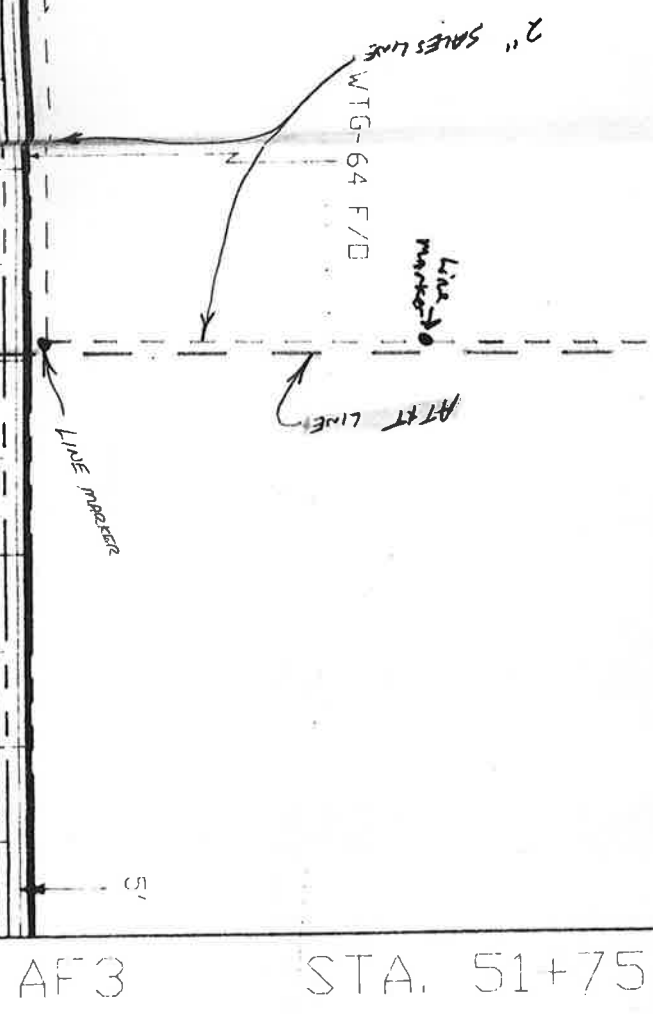
NO LEFT TURN

ST



STATION 1 AND 2
SALES LINE CROSS
OUTRIGGER USED FOR
6" GRADE 32" BELOW GRADE

RECORDED
SECTION OF
SALES LINE
10/21/02



Hren, Jonathan

From: Fetterman, Drew <Drew.Fetterman@charter.com>
Sent: Tuesday, January 10, 2017 11:12 AM
To: Hren, Jonathan
Subject: FREEDPM TRL PHASE IV
Attachments: GOOGLE.pdf; ROSA PARKS & BROADWAY.pdf; UNIVERSITY PKWY.pdf

Here are a few snap shots of what Charter has in the area of the proposed bridges.

It looks like we are clear of any work being completed. Both areas would be an UG service if we were there.

At Rosa Parks we have a new fiber line feeding the new AAA building, but it crosses south of the Rosa Parks and bus terminal intersection.

The other location I show as clear as well.

If you have any further questions please let me know. The Google map I did a quick markup on didn't scan in very clear.

Thank you

Drew



Andrew Fetterman | Construction Coordinator | 1-330-633-9203 (Option 1) Ext.330-555-3087
530 South Main Street, Suite 1751 | Akron, Oh 44311

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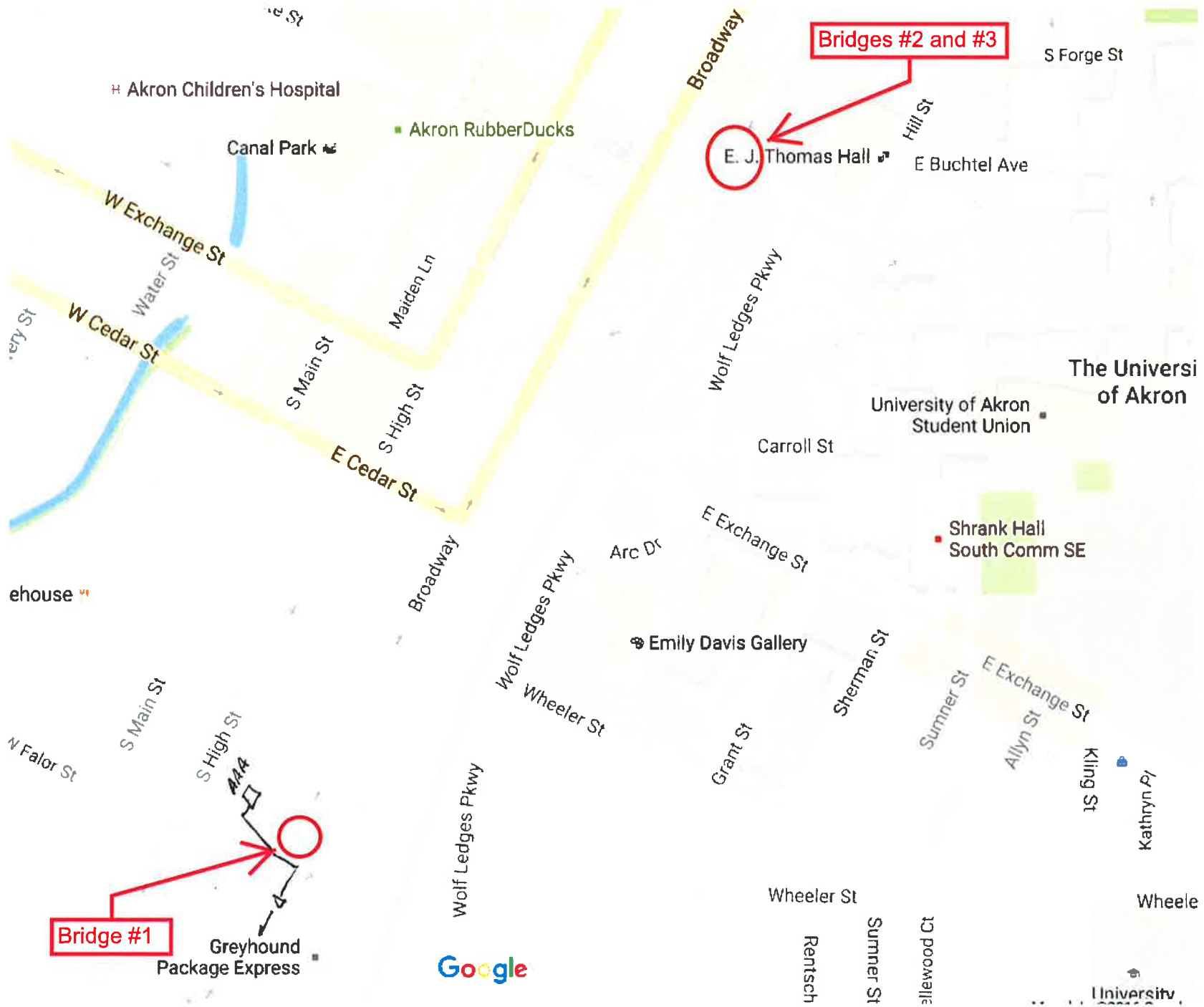


FORGE ST
COMM COPE 11-08 24CT
CUT NO FOOTAGE GIVEN

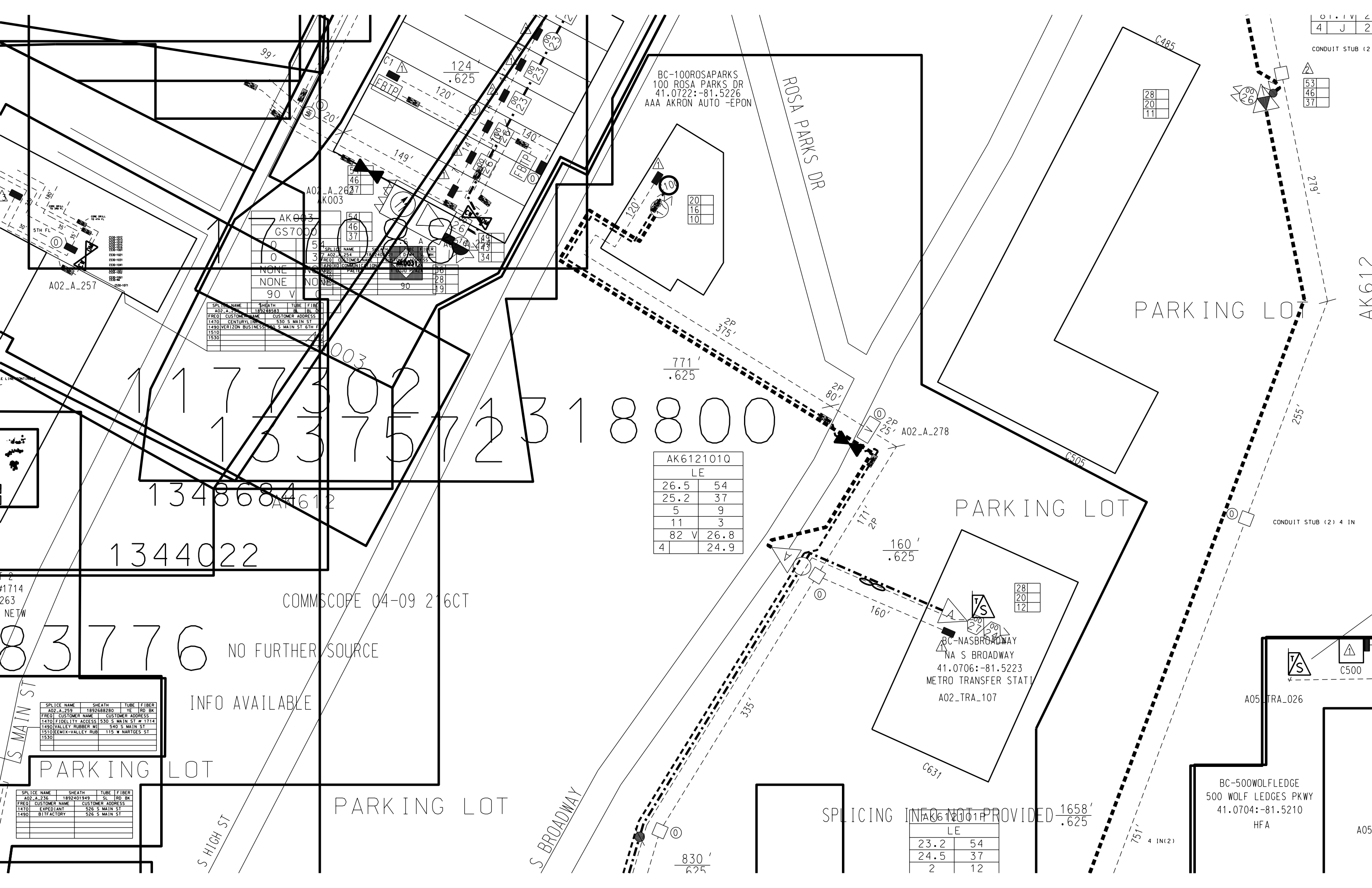
AK601

90503

Freedom Trail Phase IV - Bridge Location Map - Akron, Ohio



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1348684

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SPLICE NAME	SHEATH	TUBE	FIBER
A02_A_257	189248583	B	10
FREQ	CUSTOMER NAME	CUSTOMER ADDRESS	
1470	CENTURYLINK	530 S MAIN ST	
1490	VERIZON BUSINESS	530 S MAIN ST 6TH F	
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1490	VERIZON BUSINESS	530 S MAIN ST 6TH F	
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BC-100 ROSA PARKS
100 ROSA PARKS DR
41.0722:-81.5226
AAA AKRON AUTO -EPON

BC-NAS BROADWAY
NA S BROADWAY
41.0706:-81.5223
METRO TRANSFER STATION
A02_TRA_107

BC-500 WOLFLEDGE
500 WOLF LEDGES PKWY
41.0704:-81.5210
HFA

1344022

COMMSCOPE 04-09 216CT

NO FURTHER SOURCE

INFO AVAILABLE

PARKING LOT

PARKING LOT

PARKING LOT

PARKING LOT

SPlicing INFO NOT PROVIDED

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24.5	37
2	12

CONDUIT STUB (2) 4 IN

A05_TRA_026

A05

Hren, Jonathan

From: Chad Harkness <chad.harkness@mcgfiber.com>
Sent: Tuesday, January 10, 2017 2:27 PM
To: Hren, Jonathan
Cc: DIEDERICH, MICHAEL D (md4145@att.com); Bill Harkness; Chris McCloskey
Subject: Att Transmission's Response to Summit Metro Parks Phase 4 Bridges 1,2 and 3.
Attachments: Att Transmissions Response to Summit Metro Parks Phase 4.pdf

Mr. Ren,

On the behalf of Att Transmission/Core/Long Distance I have reviewed the prelim drawings that were mailed to the MCG office in Westerville, Ohio. Att Transmission does have facilities in the proposed project area of Bridge # 1. There are no facilities in the proposed project areas for Bridges # 2 ND 3. I would like to meet on site to go over the possible impacts of this project. At the same time there can be field data collected for a more accurate location and depth of the said facilities around Bride # 1. Please let me know if MS Consultants will be able to meet in the field. I would like to meet Tuesday or Wednesday of next week if possible.

Thank you,

Chad Harkness

Field Engineer

Cell- 770 584 7083

Email- Chad.Harkness@mcgfiber.com

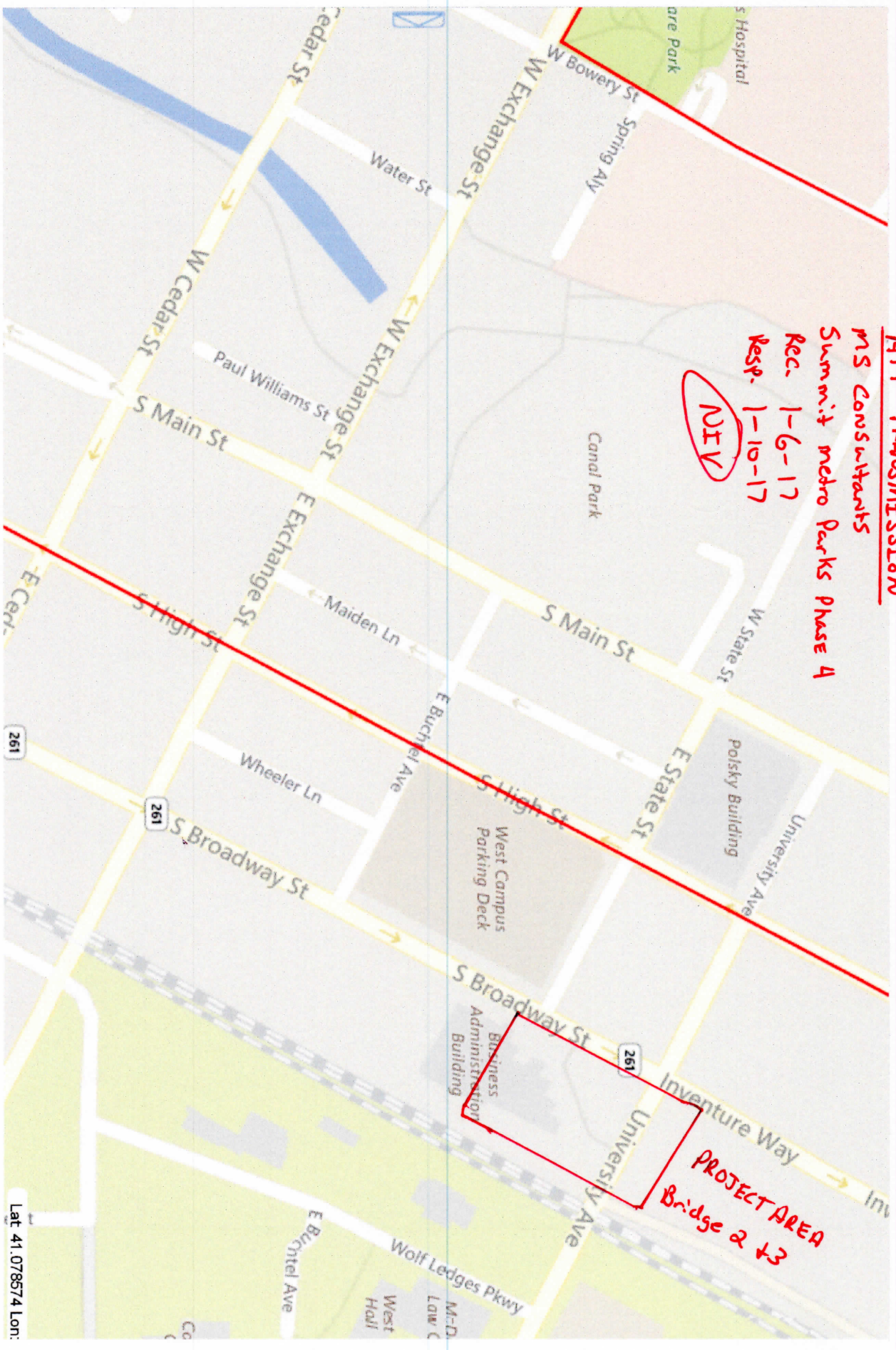


Map



Lat: 41.074971 Lon:

Map



Lat: 41.078574 Lon:

Hren, Jonathan

From: HINSHAW, LUCIE <lb2785@att.com>
Sent: Monday, January 23, 2017 7:42 AM
To: Hren, Jonathan
Subject: Freedom Trail Phase IV

Jonathan,
RE: Preliminary Bridge Type Study

AT&T Ohio anticipates no conflicts with this project at this time.

At the Bridge # 1 location AT&T Ohio has no facilities on record north of Rosa Parks Avenue between S High St and S Broadway. The intersection of Rosa Parks & S Broadway within this project's limits is also clear of any AT&T Ohio facilities.

AT&T Ohio has a buried fiber that parallels the CSXT railroad tracks but should clear this project's site limits for the Bridge # 2 and # 3 locations as well.

Please notify me with any questions, concerns or changes to the plans dated 12-19-16. Also, should a conflict arise during construction of this project, please notify AT&T as soon as possible and allow 7-10 days to resolve the conflict (depending on its severity).

Thank you,

Lucie Hinshaw
AT&T Design Engineering
Legal Mandate
50 W. Bowery St., 6th Flr
Akron, Ohio 44308
330-384-3048

Hren, Jonathan

From: CHauber@summitmetroparks.org
Sent: Thursday, April 06, 2017 8:53 AM
To: Hren, Jonathan
Subject: Fw: Freedom Trail Phase IV - Bridge 3 adjacent to AT&T

See below

Charles Hauber, PE, PS
Civil Engineer/Construction Supervisor
Summit Metro Parks
975 Treaty Line Road
Akron, Ohio 44313
330-865-8040 ext 206
330-867-4711 FAX
chauber@summitmetroparks.org

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<http://www.summitmetroparks.org>
<http://www.facebook.com/summitmetroparks>
http://www.twitter.com/metro_parks

----- Forwarded by Civil Eng Hauber.C/SCMetroParks on 04/06/2017 08:50 AM -----

From: "HINSHAW, LUCIE" <lb2785@att.com>
To: "CHauber@summitmetroparks.org" <CHauber@summitmetroparks.org>,
Date: 04/04/2017 07:18 AM
Subject: RE: Freedom Trail Phase IV - Bridge 3 adjacent to AT&T

Hi Charles,

I'm sorry ... I never saw your earlier email – and I was even looking for it because your voice mail referred to it.

I don't want to appear to be elusive, but a CWO representative would better be able to answer your questions more accurately. I do know that there is a fee to begin the process, but I do not know what that is. If you call them, you can get your questions answered without starting the process. I'm sure they will be able to give you an idea of how long the process typically takes and any fees associated with the process.

My apologies for not getting back with you sooner,

Lucie Hinshaw
AT&T Design Engineering
Legal Mandate
50 W. Bowery St., 6th Flr
Akron, Ohio 44308
330-384-3048

From: CHauber@summitmetroparks.org [<mailto:CHauber@summitmetroparks.org>]
Sent: Monday, April 03, 2017 3:10 PM
To: HINSHAW, LUCIE <lb2785@att.com>
Subject: Fw: Freedom Trail Phase IV - Bridge 3 adjacent to AT&T

Good afternoon Lucie,

I'm following up with my earlier email. Any information you can provide will be helpful. Thank you

Charles Hauber, PE, PS
Civil Engineer/Construction Supervisor
Summit Metro Parks
975 Treaty Line Road
Akron, Ohio 44313
330-865-8040 ext 206
330-867-4711 FAX
chauber@summitmetroparks.org

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http://www.twitter.com/metro_parks

----- Forwarded by Civil Eng Hauber.C/SCMetroParks on 04/03/2017 03:03 PM -----

From: Civil Eng Hauber.C/SCMetroParks
To: "HINSHAW, LUCIE" <lb2785@att.com>,
Cc: "Hren, Jonathan" <jhren@msconsultants.com>
Date: 03/24/2017 03:07 PM
Subject: Fw: Freedom Trail Phase IV - Bridge 3 adjacent to AT&T

Lucie,

The Metro Parks project noted below is in the "study" phase, which is basically a conceptual design and preliminary cost. We do not have a timeline on final design and construction.

How long is the CWO process and is there a fee Metro Parks must pay to initiate the process?

At this stage of the project, Metro Parks may decide to initiation the CWO later in the project during the detailed design stage and use a ballpark park cost relocate the cable for the study.

Thank you. Have a good weekend.

Charles Hauber, PE, PS
Civil Engineer/Construction Supervisor
Summit Metro Parks
975 Treaty Line Road
Akron, Ohio 44313
330-865-8040 ext 206
330-867-4711 FAX
chauber@summitmetroparks.org

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http://www.twitter.com/metro_parks

----- Forwarded by Civil Eng Hauber.C/SCMetroParks on 03/24/2017 02:58 PM -----

From: "Hren, Jonathan" <jhren@msconsultants.com>
To: "PE PS Charles Hauber (CHauber@summitmetroparks.org)" <CHauber@summitmetroparks.org>,
Date: 03/15/2017 09:30 AM
Subject: FW: Freedom Trail Phase IV - Bridge 3 adjacent to AT&T

Chuck, please see below. As you though, ATT does not have an easement. Please let me know how you would like us to proceed.

Jonathan Hren

From: HINSHAW, LUCIE [<mailto:lb2785@att.com>]
Sent: Wednesday, March 15, 2017 7:57 AM
To: Hren, Jonathan
Subject: FW: Freedom Trail Phase IV - Bridge 3 adjacent to AT&T

Jonathan,
I just heard back from AT&T's ROW/Easement department. AT&T does not have an easement paralleling the RR tracks behind E J Thomas Hall (Hill St), however because that fiber cable (in possible conflict) is a service line to the University, there would be a charge to relocate it. I cannot give you a ballpark figure to relocate this service; the process to prepare a quote to relocate this service begins in AT&T's Customer Work Order (CWO) group @ (888) 901-2779. Once an account is established in the CWO department they will forward a request to Engineering to prepare a quote.

Regards,
Lucie Hinshaw
AT&T Design Engineering
Legal Mandate
50 W. Bowery St., 6th Flr
Akron, Ohio 44308
330-384-3048

From: HINSHAW, LUCIE
Sent: Friday, February 24, 2017 12:54 PM
To: Hren, Jonathan <jhren@msconsultants.com>
Cc: Ranno, Sam <sranno@msconsultants.com>; PE PS Charles Hauber (CHauber@summitmetroparks.org) <CHauber@summitmetroparks.org>
Subject: RE: Freedom Trail Phase IV - Bridge 3 adjacent to AT&T

Jonathan,
I just got a call from a locate technician. He found our fiber and is in the process of flagging it right now. I just wanted to let you know so that you or someone from your company can make a field visit to verify possible conflicts within the next few days. Flags don't stay upright for long. I had him flag our facilities north of University Ave for 1000' paralleling the RR tracks.
Regards,

Lucie Hinshaw
AT&T Design Engineering
Legal Mandate
50 W. Bowery St., 6th Flr
Akron, Ohio 44308
330-384-3048

From: Hren, Jonathan [<mailto:jhren@msconsultants.com>]
Sent: Thursday, February 23, 2017 8:14 AM
To: HINSHAW, LUCIE <lb2785@att.com>
Cc: Ranno, Sam <sranno@msconsultants.com>; PE PS Charles Hauber (CHauber@summitmetroparks.org) <CHauber@summitmetroparks.org>
Subject: RE: Freedom Trail Phase IV - Bridge 3 adjacent to AT&T

Lucie,
I appreciate your prompt attention to this matter, and I look forward to hearing back.

(Please note our new address and phone number)

Jonathan D. Hren, PE

ms consultants, inc | engineers, architects, planners
Van Sweringen Arcade, 123 West Prospect Avenue, Suite 250
Cleveland, OH 44115-3806

p: 216-658-2512

c: 216-403-0886

f: 330-744-5256

e: jhren@msconsultants.com

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From: HINSHAW, LUCIE [<mailto:lb2785@att.com>]
Sent: Wednesday, February 22, 2017 3:18 PM
To: Hren, Jonathan
Cc: Ranno, Sam; PE PS Charles Hauber (CHauber@summitmetroparks.org)
Subject: RE: Freedom Trail Phase IV - Bridge 3 adjacent to AT&T

Jonathan,

I have submitted an OUPS ticket (#A705302784) to have AT&T's fiber cable located. This fiber was placed in 1994. Back then the fiber placement process with locatable wire was not utilized – meaning it may be possible that the OUPS folks will not be able to locate that fiber cable.

I have also submitted an easement search request. We have to allow up to 45 days for this type of request. In my experience with the ROW department, it does not usually take that long for an answer.

I will let you know as soon as I hear back from either/both of these requests.

Regards,

Lucie Hinshaw
AT&T Design Engineering
Legal Mandate
50 W. Bowery St., 6th Flr
Akron, Ohio 44308
330-384-3048

From: Hren, Jonathan [<mailto:jhren@msconsultants.com>]
Sent: Wednesday, February 22, 2017 11:50 AM
To: HINSHAW, LUCIE <lb2785@att.com>
Cc: Ranno, Sam <sranno@msconsultants.com>; PE PS Charles Hauber (CHauber@summitmetroparks.org)

<CHauber@summitmetroparks.org>

Subject: Re: Freedom Trail Phase IV - Bridge 3 adjacent to AT&T

Lucie

I appreciate your response. We are trying to wrap up this bridge type study as soon as possible, and it is dependent on the actual ATT line and easement. Anything you can do to help expedite is very helpful. I understand you have other things going on. Thank you.

Jonathan D. Hren
Sent from my iPhone
216-403-0886

On Feb 22, 2017, at 7:10 AM, HINSHAW, LUCIE <lb2785@att.com> wrote:

Jonathan,

Sorry for the delay in response. I need to re-look at this project, call in an OUPS ticket to locate our facilities and send in an easement search request. Do you have a time frame on this project? I have several massive projects coming due this March - - like next week, so I need to prioritize.

Let me know your time line as soon as possible.

Thanks,

Lucie Hinshaw
AT&T Design Engineering
Legal Mandate
50 W. Bowers St., 6th Flr
Akron, Ohio 44308
330-384-3048

From: Hren, Jonathan [<mailto:jhren@msconsultants.com>]

Sent: Tuesday, February 21, 2017 3:13 PM

To: HINSHAW, LUCIE <lb2785@att.com>

Cc: Ranno, Sam <sranno@msconsultants.com>; PE PS Charles Hauber (CHauber@summitmetroparks.org) <CHauber@summitmetroparks.org>

Subject: RE: Freedom Trail Phase IV - Bridge 3 adjacent to AT&T

Dear Lucie Hinshaw,

Attached please find the updated plans for Bridge 3, showing the relocated bridge to be within the property line. We attempted to show the FO line in the plan and typical section. As you can see, the bridge is now pushed quite close to where the ATT FO line and/or easement may be. As I mention below, can you please review these plans, and provide any additional information about this FO, so we can pass along to our client the Summit Metro Parks?

Kind regards,

(Please note our new address and phone number)

Jonathan D. Hren, PE

ms consultants, inc | engineers, architects, planners
Van Sweringen Arcade, 123 West Prospect Avenue, Suite 250
Cleveland, OH 44115-3806

p: 216-658-2512
c: 216-403-0886

f: 330-744-5256

e: jhren@msconsultants.com

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[<image001.png>](#)

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From: Hren, Jonathan

Sent: Monday, February 20, 2017 10:53 AM

To: 'HINSHAW, LUCIE'

Cc: Ranno, Sam; PE PS Charles Hauber (CHauber@summitmetroparks.org)

Subject: RE: Freedom Trail Phase IV - Bridge 3 adjacent to AT&T

Dear Lucie Hinshaw,

Thank you for your comments below. We need to move attached Bridge #3 to the west, to keep the structure within the ROW (we have not yet move the bridge). Thus the structure will be closer to the ATT FO line. We plotted the FO using your description below and also the FO markers, such as the one in the photo attached.

Is there a way that you can have your line marked in the field so we can be sure of its location?

Is there an easement which ATT owns that we need to avoid?

Thanks,

(Please note our new address and phone number)

Jonathan D. Hren, PE

[ms consultants, inc](#) | engineers, architects, planners

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From: HINSHAW, LUCIE [<mailto:lb2785@att.com>]

Sent: Monday, January 23, 2017 7:42 AM

To: Hren, Jonathan

Subject: Freedom Trail Phase IV

Jonathan,
RE: Preliminary Bridge Type Study

AT&T Ohio anticipates no conflicts with this project at this time.

At the Bridge # 1 location AT&T Ohio has no facilities on record north of Rosa Parks Avenue between S High St and S Broadway. The intersection of Rosa Parks & S Broadway within this project's limits is also clear of any AT&T Ohio facilities. AT&T Ohio has a buried fiber that parallels the CSXT railroad tracks but should clear this project's site limits for the Bridge # 2 and # 3 locations as well.

Please notify me with any questions, concerns or changes to the plans dated 12-19-16. Also, should a conflict arise during construction of this project, please notify AT&T as soon as possible and allow 7-10 days to resolve the conflict (depending on its severity).

Thank you,

Lucie Hinshaw
AT&T Design Engineering
Legal Mandate
50 W. Bowery St., 6th Flr
Akron, Ohio 44308
330-384-3048

This message and any response to it may constitute a public record and thus may be publicly available to anyone who requests it.

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Appendix F

Disposition of Summit Metro Parks Comments

Report Text:

Page 1

1. Include address for Schipper Lot. 473 South Main Street.

Response: Will comply.

2. METRO RTA Right of Way. Not CSXT.

Response: Will comply.

3. Include an 8-1/2"x11" vicinity map labeling the bridges and surrounding streets.

Response: Will comply.

Page 2

4. Insert a paragraph discussing the underground storage tanks. See comments on the Environmental Assessment.

Response: Will comply.

5. Note if piers or h-piles required for the MSE wall.

Response: The recommended alternative is now a ramp bridge structure. The summary has been updated.

6. Note that the structures require h-piles or drilled piers.

Response: Will comply.

Page 6

7. Based on the number for bridges 2 and 3, a pedestrian bridge structure cost less than MSE walls. Please confirm the proposed alternates are the most cost effective. Ensure the preliminary design and cost include adequate foundations/piers/h-piles for the MSE wall if warranted by the soil borings. Would a ramp structure be more cost effective?

Response: See response to No. 5 above.

8. Include recommended foundation types for MSE walls.

Response: Will comply.

9. Add sentence; "*Alternate #2 is the recommended alternate*". State which alternate is recommended in the discussion. Typical all recommended alternates.

Response: Will comply.

10. Total length of MSE and Bridge is 475' for alt 1 and 521 for alt 2. Yet Alt 2 cost is less. In addition, Alt 1 has a shorter length of MSE than Alt 2 but more square feet than Alt 2. Check numbers. Provide a 2-3 sentence explanation of why alt 2 cost less than alt 1.

Response: Will comply.

11. Insert a page break after paragraphs C.b. and add the renderings for alternates 1 and 2.

Response: The renderings are now complete and are only for Alternative 3. They are included in the appendix for ease of inclusion.

12. Include discussion/provisions for the underground storage tanks noted in the environmental site assessment.

Response: Will comply.

Page 7

13. Note that Bridge 2 is on the south side of University Ave, on property owned by the City of Akron.

Response: Will comply.

14. In general, for bridges 2 and 3, the cost estimates show the bridges cost less than an MSE wall. Should we use less MSE wall at Bridge 1 on the Schipper property?

Response: See responses above.

15. Metro Parks will follow up with utility confirmation.

Response: Noted.

Page 8

16. State alternate #2 is the recommended alternate.

Response: Please see similar response for Bridge 1 and confirm.

Page 9

17. Note Bridge 3 is on the north side of University Ave on property owned by Metro RTA.

Response: We will clarify.

Page 10

18. Note this is the recommended alternate.

Response: Please see similar response for Bridge 1 and confirm.

Appendix A – Page 1

19. Include property address.

Response: Will comply.

20. State if 475 S. High Street is located within or outside of the project limits.

Response: Will comply. Environmental Design Group to clarify 475 S. High Street in Environmental Site Assessment.

Appendix A – Page 4

21. Add suggestions or examples of soil & ground water management to the "Investigations" section. Also include a cost in Appendix B.

Response: Will comply. Environmental Design Group will add a potential soil and groundwater management option and include a cost in Appendix B

Timmerman Geotechnical Group – Page 7

22. Are these recommendations applicable to MSE Walls?

Response: No, MSE walls were not recommended at Bridge 1.

Appendix C – Sheet 1/5 (Bridge 1)

23. Note if MSE wall is on h-piles or drilled piers. Typical all drawings.

Response: MSE wall would be founded on improved ground. We choose “rammed aggregate piers”, which we have used before on other projects, and included this cost for comparison purposes.

24. Note if bridge is on h-piles or drilled piers. Typical all drawings.

Response: We will clarify the plans. The bridge is on H piles.

25. Label % grade. 5% is the maximum on all grades.

Response: Will comply.

26. Label % grade.

Response: Will comply.

Appendix C – Sheet 4/5 (Bridge 1)

27. Add and label footers and piers/h-piles for MSE wall if applicable.

Response: Will comply. As noted above, ground improvements or rammed aggregate piers may be needed.

Appendix C – Sheet 1/4 (Bridge 2)

28. Metro Parks will verify property lines and follow up.

Response: Noted. We have received some recent information in this regard. The updated plans reflect all property lines.

29. Place trail parallel with existing retaining wall, 12' wide.

Response: Will comply.

30. 5% max. State in the discussion if 8.33% is necessary due to clearance under the walkway.

Response: Will revise narrative discussion to state that the 8'-0" minimum vertical clearance to the walkway is barely achievable with the 8.33% slope, therefore we cannot change the slope to 5%. Note that this is based on minimal field measurements by ms consultants. We suggest that the SMP have their surveyor measure the vertical clearance to the structure to confirm at Stage 1 design.

According to AASHTO Guide to Bicycle Facilities, 4th Edition, 5.2.7, the maximum grade should be 5%, and any grades steeper than that are undesirable. The ANPRM suggests that certain conditions such as physical constraints ... may prevent full compliance with the 5 percent maximum grade. AASHTO 5.2.3 states that "The recommended minimum vertical clearance that can be used in constrained areas is 8 ft." In order to meet the minimum clearance recommended, a grade of 8.33% must be used for this portion of trail.

31. Provide a 2% max, 10' long landing before the bridge only if you can maintain the 8.33% grade and 8' vertical clearance.

Response: The 8'-0" minimum vertical clearance is barely achievable with the 8.33% slope, therefore we could not provide for the landing, unless the trail alignment is modified. A possible landing solution would be to provide it oriented parallel with University Avenue. This could be detailed at Stage 1 design.

Appendix C – Sheet 2/4 (Bridge 2)

32. Keep 12' wide and parallel with existing wall.

Response: Will comply.

33. Show/label footer and h-piles/piers if applicable.

Response: Deep foundations are not required for this MSE wall.

Appendix C – Sheet 1/3 (Bridge 3)

34. Metro Parks will verify property lines and follow up.

Response: Noted. We have received some recent information in this regard. The updated plans reflect all property lines.

35. 2% max, 10' long landing before bridge.

Response: Will comply. This landing can be provided.

36. 5% max grade.

Response: Will comply.

Cost Estimates:

1. Add cost for environmental work provided by EDG for Structure 1.
ms Response: complied

2. 2. Add an item for Maintenance of Traffic (MOT). MOT will be considerable at Bridge 1 due to the bus traffic and traffic on S. Broadway.
ms Response: A lump sum cost of \$20,000 has been included for Portable Barrier and signage for the construction of the abutments.

Bridge 1:

3. In all profile view, show and label the trail over/under passes.
ms Response: complied

4. Profile Alternate 3, should there be a 2:1 slope on the west abutment between station 34+00 and 34+75?
ms Response: No, there should not be a 2:1 and it has been removed. We have added the proposed bridge ramp under the main span in the profile view.

Bridge 2:

5. Typical section alternates 1, 2, 3 check the trail width label 6 ft or 6ft min to 8 ft max?---
YES, 6-8 feet correct due to existing retaining wall.
ms Response: No comment.

Bridges 2 and 3:

6. Show the Metro RTA and City of Akron property lines in the typical sections.-AECOM
ms Response: complied. Based on the property line at Bridge 3, and the assumed location of the ATT Fiber Optic, we have relocated Bridge 3 to be along the property line. These plans have been sent to ATT Ohio on 2/21/17 to ask for further confirmation of their proposed FO location. They responded by field marking their utilities. SMP's surveyor gave us the updated basemap with these markings located. The bridge location was modified accordingly and the plans reflect this.

7. In the plan view, check the property lines on the drawing with the CAD file property lines emailed 1/5/2017.- Make AECOM property lines bolder.
ms Response: See response to comment #6.